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Basic Factors in Flood Frequency in the Lower Mississippi River

By Lewis F. Thomas, Ph.D.
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ARE great floods becoming more frequent in the Lower Mississippi River? In terms of volumes of water involved, the answer is no, since the fundamental physical causes of these floods are substantially unchanging. In terms of dollars in losses, the answer is yes, since the economic development of the areas affected is progressively becoming more valuable. The greatness of a flood may be expressed in various ways, (1) by the size of the area inundated, (2) by the value of the economic losses sustained, (3) by the height of the gage readings, and (4) by the volume of the waters discharged. The records of the United States bureaus show that there have been notable floods in the years, 1815, 1828, 1844, 1849, 1850, 1851, 1858, 1859, 1862, 1865, 1867, 1874, 1882, 1884, 1890, 1893, 1897, 1903, 1912, 1913, 1916, 1922 and 1927. Since 1871 careful and detailed flood records have been kept at all strategic flood points in the Mississippi Basin. Because of the data available, the floods subsequent to 1871 have been studied individually and collectively. The floods prior to 1871 are known only in a general way through the compilation of data from numerous and miscellaneous sources. A resume of the general conditions which exist in the Mississippi Basin is the setting of flood causation.

The Mississippi River Basin

The Mississippi Basin comprises some 1,250,900 square miles which are apportioned among its major divisions as follows: Upper Mississippi River 172,000 or 14 per cent, Missouri River 528,850 or 42 per cent, Ohio River 203,900 or 16 per cent, Arkansas River 186,000 or 15 per cent, Red River 90,000 or 7 per cent, and Lower Mississippi River 70,150 or 6 per cent.

The Upper Mississippi River is about 1200 miles in length. It has as its important tributaries the Leach Lake, Crow Wing, Minnesota, St. Croix, Chippewa, Wisconsin, Rock, Illinois, Iowa, and Des Moines rivers. The headwaters of the rivers which rise in northern Wisconsin, upper Michigan, and northern Minnesota wind in circuitous courses through lakes, swamps, and bogs in the timbered morainic hills of sand and gravel. These features tend to check rapid run-off and as a consequence few floods arise from this region. The prairie portions of the Upper Mississippi Basin are in southern Wisconsin, southern Minnesota, eastern Iowa, and northern Illinois. The once vast tree dotted grasslands are now productive with abundant farm crops, and numerous livestock.

The Missouri River, which is formed by the confluence of the Jefferson, Madison, and Gallatin rivers, in the southwestern part of Montana, flows 2824 miles in a southeasterly direction to join the Mississippi River a few miles above St. Louis, Missouri. Its principal tributaries are the Milk, Marias, Sun, Yellowstone, Grand (South Dakota), Cheyenne, White, Niobrara, Platte, Kansas, Osage, Grand

(Missouri), and Gasconade rivers. The few of the rivers which rise on the eastern slopes of the Rocky Mountains are fed from springs, lakes, and snow fields of that region. The major portion of the Missouri Basin lies in the semi-arid Great Plains. Here the streams are sluggish, turbid, full of shoals and islands, and bordered by easily eroded banks of sand and clay. On the flood plains fields of irrigated crops have replaced the sickly fringe of cottonwoods and willows which once lined the water courses. On the wide gently undulating interstream areas ranching prevails with some dry farming. The tributaries of the lower Missouri Basin drain the western portion of the Corn Belt, or the northern slopes of the Ozarks. The rivers of the Corn Belt section in eastern Nebraska, eastern Kansas, western Iowa, and northern Missouri have numerous tributaries which have carved the uplands into belts of gently rolling hills or flat-topped ridges. The northern slopes of the Ozarks are maturely dissected hills whose steep rocky sides favor swift streams, rapid run-off and sudden floods. The basin of the Gasconade River is typical.

The length of the Ohio River from Pittsburg, Pennsylvania, to Cairo, Illinois, is 965 miles. The headwaters, the Allegheny and Monongahela rivers, together with the tributaries Licking, Muskingum, Little Kanawha, Great Kanawha, Big Sandy, Kentucky, Cumberland, and Tennessee rivers drain the wooded rugged, rocky hills of the Appalachian Plateaus. The clearing of some of the forests together with the steepness and completeness of surface drainage provide conditions favorable for sudden rises in these rivers in periods of heavy rains. Other important tributaries to the Ohio River are the Scioto, Miami, and Wabash rivers. These rivers in western Ohio, Indiana, and eastern Illinois (the eastern Corn Belt) are similar to those in the western Corn Belt.

The Arkansas River rises in central Colorado, in the Rocky Mountains. After passing through the Royal Gorge, it emerges on the Great Plains; crosses eastern Colorado, southern Kansas, northeastern Oklahoma, and central Arkansas; and empties into the Mississippi River in southeastern Arkansas. In its 1610 miles, it resembles the Missouri River features. Its headwaters are clear on a bed of pebbles and rock. In the Great Plains section, the Cimarron and Canadian tributaries add their contribution of mud and quick sand to that of the Arkansas. The lower Arkansas flows through a region rich in agriculture of the plantation type where cotton and rice predominate. The most volume is added by the White River which rises in the rugged hills of the Ozarks and Boston Mountains.

The Red River is about 800 miles in length from its sources in west Texas to the Lower Mississippi in Louisiana Its flow through much of its course is scanty and precarious, since it is dependent solely upon immediate run off from rains. In its lower course it fares better in a region of more abundant and regular rainfall.

The Lower Mississippi River extends from the mouth of the Missouri River to the passes at the Gulf of Mexico. About half of the basin is alluvial flood-plain type comprising some 30,000 square miles. These plains are about 600 miles in length, but the river meanders through a course exceeding 1100 miles. The surface has a very low gradient which combined with the oxbow lakes, sloughs, and bayous, and with the timbered sections favors very slow run-off of precipitation. Prior to the building of levees and the organization of drainage districts much of the

basin was subject to inundations and as a consequence lay idle. Since these projects have been completed large sections are cultivated and devoted to cotton growing. It is this basin that suffers most from floods in the Mississippi River system.

OCCURRENCE OF SEVERE FLOODS

The comparative severity of floods is usually determined by levels reached by the various floods on the same gage. By way of illustration, the gage at the mouth of White River, Arkansas, may be selected as typical of readings along the Lower Mississippi River. The gage is located 391.7 miles below Cairo, Illinois, and has its zero at 108.86 feet above mean Gulf level. The highest annual minimum is 14.20 feet, while the majority of such readings are below 7.00 feet. The flood stage at this station is 48.00 feet. The years when floods attained or exceeded this mark are: 1862, 48.20; 1882, 48.40; 1883, 48.00; 1886, 48.20; 1890, 50.40; 1892, 49.27; 1893, 49.48; 1897, 52.42; 1898, 51.05; 1899, 48.49; 1903, 53.70; 1904, 49.50; 1906, 49.80; 1907, 51.90; 1908, 49.50; 1909, 49.95; 1911, 48.33; 1912, 56.35; 1913, 55.35; 1916, 56.50; 1917, 51.57; 1919, 49.38; 1920, 53.10; 1922, 56.85; and 1927, 60.25. It is quite apparent that there is a tendency toward higher and higher readings culminating in the record breaking flood of 1927. An examination of other Lower Mississippi River stations reveals similar trends.

Further survey of the flood data shows that stations on the major tributaries have their record maximum in different years, and that even on the same tributary stations may have had the records set in different years. On the Upper Mississippi River, these gages recorded their maximum as indicated; St. Paul, Minnesota, 1881; Winona, Minnesota, 1880; Rock Island, Illinois, 1892; Burlington, Iowa, 1851; Nashville, Iowa, 1888; Hannibal, Missouri, 1903; St. Louis, Missouri, 1844. On the Missouri River, the record maximum was made at Kansas City, Missouri, in 1844, and at St. Charles, Missouri, in the same year. On the Ohio River, the records were broken at Pittsburg, Pennsylvania, 1907; at Cincinnati, Ohio, 1884; at Louisville, Kentucky, 1884; at Evansville, Indiana, 1844; at Paducah, Kentucky, 1913; and at Cairo, Illinois, 1927. On the Red River at Shreveport, Louisiana, and on the Arkansas River at Little Rock records were set in 1927.

The area of the overflowed land has varied during the various great floods due to the holding, extension or breaking of the levees. Before 1880 the Lower Mississippi River had practically free, open, and unrestricted channel conditions, so that the areas flooded by severe floods were about the same each time: 29,790 square miles. Beginning in 1880, there has been progressive extension, raising, and strengthening of levees. By 1916 the river was practically canalized from Cairo to the Gulf. The effects of this levee building have been more pronounced than the figures indicate, because the flood marks at stations below Cairo, Illinois, have been changed to meet the new conditions several times since 1896.

Contemporaneous with the building of levees has occurred a general shrinkage in the area flooded as is indicated: 1897, 13,580; 1903, 6,820; 1912, 17,605; 1922, 13,200; and in 1927 when the levee system collapsed, estimated 15,000 to 18,000 square miles. The losses may be classified as, (1) property losses exclusive of crops, (2) crop loss and damage, (3) damage to farm lands, and (4) losses occasioned through enforced suspension of business. The estimated losses for 1897 were $15,000,000 for agricultural damage. In

1903 a total of $40,000,000; in 1912, $78,000,000; in 1922, $17,087,790; and in 1927 about $285,000,000 in losses. Such losses even though they be rough estimates cause one to ask: How often must these losses be borne?

FREQUENCY OF SEVERE FLOODS

Attempts have been made to reduce the question of flood frequency to a mathematical basis. One set of calculations has been prepared for the Lower Mississippi River. Selecting New Orleans as typical it is illustrated by the number of ordinary floods per decade from 1871 to 1922, thus: 7, 10, 9, 6, 7, total 39. The frequency for severe floods at the same place and period is: 1, 1, 3, 3, 5, total 13. Vicksburg, Mississippi, and Memphis, Tennessee, show similar series. The expectancy or average interval in years between ordinary floods has been computed as 1.33 at New Orleans, 1.30 at Vicksburg, and 1.37 at Memphis. The similar expectancy for severe floods at the same places is respectively, 4.00, 3.06, and 5.20. The lack of correlation which is noticeable between the ordinary and severe floods is due to the fact that ordinary floods may be and frequently are caused by high waters in a single tributary, particularly the Ohio River, while severe floods are usually the result of high waters in two or more tributaries. The fact that the tributaries do not have high waters at the same time, except rarely, was shown by the data above for the years breaking records.

The flood frequencies of the major tributaries further show the lack of coincidence of high waters. This is shown for ordinary and severe floods (latter marked *) as follows: the Ohio River at Cairo, 1.33 and *2.08; the Upper Mississippi River at St. Louis, 2.74 and *10.40; the Arkansas River at Little Rock, 1.41 and *5.78; and the Red River at Alexandria, 3.80 and *38.00. Thus it is evident that the chances of high waters occurring at the same time on all the major tributaries is rare. The last flood, 1927, was the nearest approach. Moreover it appears that there is a close relation between the floods of the Ohio and the Lower Mississippi rivers.

CAUSES OF FLOODS

Students of the floods assert that the Ohio River is by itself capable of producing severe floods in the Lower Mississippi River. And so another set of calculations has been made to determine the frequency of floods in the Ohio River. It appears from a study which correlates precipitation data and flood occurrence data in this basin that there is no evidence of increasing frequency of floods. It does demonstrate that there is a cause and effect relation between the precipitation features and floods. Thus, there was a rainfall deficiency in the Ohio Basin during the decade 1870–1880 which would account for the lack of floods of any noticeable size in that period. In 1881 to 1883 there was a large excess in rainfall which accounts for the great floods of those years, culminating in the record gage reading of 71.07 in 1884. Then followed a period of deficiency with no floods. In 1890 there was a local excess in the lower Ohio Basin which tallies with the flood in that part of the valley. Then drought followed, and no floods resulted until 1897; then a couple of years of heavy rains with corresponding floods; a term of dry years to 1906, then rains and floods in 1907. Similar studies concerning the Upper Mississippi River and lower Missouri River show conclusively that precipitation conditions are competent to produce the floods, and that the floods are as irregular in occurrence as precipitation conditions are fickle. Hence a review

of the general conditions in the Mississippi Basin with regard to precipitation will aid in understanding the factors of flood frequency.

Normally there is scanty precipitation over the western and northern portions of the Mississippi Basin in January, February and March. At the same time rainy conditions prevail over the southern Appalachians. During April and May precipitation reaches its greatest amount over the West. In June two rainy centers appear: one in the Lower Mississippi, and the other in the lower Missouri basins. In July and August, rainfall diminishes in the West and becomes uniform over the Lower Mississippi Valley. September, October, November and December successively approach winter conditions with light precipitation over the West, and intense heavy downpours over the lower valley in December. The character of the ground, whether frozen or water soaked, has a great deal to do with the percentage of run-off from these precipitation conditions.

It has been estimated that about twenty-seven per cent of the precipitation in the Upper Mississippi Basin finds its way to the rivers and amounts to about 230,130,000,000 cubic yards of water. The early summer rains and winter scantiness result in a single swell reaching its height in June and declining to August, with marked low water levels to late January when the swell begins again.

In the Missouri Basin about fifteen per cent of the rainfall reaches the rivers and gives a normal discharge of about 131,230,000,000 cubic yards of water. The Missouri minimum occurs in December and rises to a minor swell in May which is followed by a major swell in June, after which the river level falls rapidly to a December minimum.

The Ohio Basin receives the most abundant and well distributed precipitation of all the component basins. This with its thirty per cent run-off totals about 230,130,000,000 cubic yards of water which makes it rank first in volume among the tributaries. The Ohio River normally because of winter rains in the Appalachians, has high water in March. Its low stages come in October.

The Mississippi River regimen below Cairo is the composite of the combined swells of its tributaries. The main swell of the Ohio River reaches Cairo about the middle of April, having risen rapidly. The ebbing of the swell is checked by the rising swells from the Upper Mississippi and Missouri rivers. Hence the swell below Cairo consists of one long sweeping rise for six months and one long decline of similar length. The heavy rains over the Lower Mississippi Basin at times aggravate the normally high waters into flood conditions.

The Arkansas River discharges about fifteen per cent of its precipitation amounting to about 74,070,000,000 cubic yards of water. The Arkansas River is low in August and high in May. Its swell normally has no effect upon the regimen of the Mississippi River.

The Red River with its annual discharge of 66,670,000,000 cubic yards of water, representing about twenty-two per cent of its rainfall, has a range similar to the Arkansas with similar lack of normal effects.

It may be noted again that the timing of these various swells from the major tributaries, considered from the standpoint also of their geographic location, gives a rhythmical succession of increments which normally results in harmless high waters. However, normal conditions do not always persist. In every case the floods can be traced to excess discharges from some one or more basins.

The actual discharges of water in a few of the great floods 1882, 1903, 1912,

1913, 1915–16, 1920 and 1922 according to calculation each exceeded 159,000,000,000 cubic yards. For example, the flood of 1882 was made up as follows: Ohio River, 107,868; Upper Mississippi River, 30,693; Lower Mississippi River, 68,005; Missouri River 25,826; and Red River 24,874 making a grand total of 272,137 in millions of cubic yards of water. This flood which is rated as an exceptionally severe one is typical of the kind produced by a great discharge from the Ohio River basin. The flood occurred early in 1882. During the months of January, February and March when the above discharges occurred, there was an excess precipitation over the southern half of the Ohio Basin and Lower Mississippi Basin, and over the lower Arkansas and Red basins ranging from 8 to 12 inches excess.

In 1927 all the rivers south of the Des Moines River were in excess discharge, with excesses ranging from six to nine inches in Iowa to twenty-three inches in the middle Arkansas Valley. The nearest approach to such conditions in the recorded past occurred in 1922 when there were excesses over the lower Ohio and Mississippi basins in February, with a spreading of excess conditions to the northward over the lower Missouri and lower Upper Mississippi basins by March. The total discharge of this 1922 flood is estimated at 265,146,000,000 cubic yards of water. The evenness of the distribution of excess is shown as follows: Ohio River, 81,115; Upper Mississippi, 31,410; Lower Mississippi, 52,658; Missouri, 39,589; Arkansas, 31,410; and Red, 27,962 millions of cubic yards of water.

The flood discharges for the other floods listed (in millions of cubic yards) are: 1882, 272,137; 1903, 200,786; 1912, 239,774; 1913, 228,759; 1915–16, 170,049; 1920, 159,196; 1922, 365,146. These figures give some notion of the immense volumes of water which pass down the Mississippi River at flood times. As a measuring stick, the normal river flow past St. Louis, Missouri, is estimated at 225,000 cubic feet per second. It is stated by observers at Little Rock, Arkansas, that the Arkansas River ran at 813,000 cubic feet per second during the 1927 flood.

CONCLUSIONS

It may be concluded:

I. That the basic factors of severe floods causation are uncontrollable.

II. That the frequency of severe flood occurrence is a function of precipitation and varies irregularly as the amount and distribution of precipitation varies.

III. That the engineering problem is to regulate the flow of flood waters and prevent the inundation of valuable lands.

IV. Supplementary, that such engineering works should be designed to conserve the features of the rivers adapted to waterpower, navigation, water supply, and sanitation.

The Geography of the Mississippi Valley

By Frank E. Williams
University of Pennsylvania

When Daniel Boone returned from one of his hunting and exploring expeditions, he was more than usually extravagant in his praises of the area he had just visited—that reached by passing westward through the famous Cumberland Gap. Here was a land described as rich in growth of all those hardwoods which show unusual fertility in the soil. The region he had seen was a part of the now well-known Blue Grass Region—a basin rich in agricultural development. But the Blue Grass Region, although one of the richest, is only a speck in that larger area of high fertility and gentle topography which reaches from the Alleghanies to the Rockies and is for the most part contained in the Mississippi Valley.

The Great Mississippi River and more than fifty navigable tributaries furnish about 14,000 miles of waterways and border or traverse twenty-seven states whose combined area is 1,935,952 square miles (65 per cent of U. S.). Of these twenty-seven states, seventeen are entirely or very largely within the Mississippi Drainage System. The importance of this great inland empire is unappreciated by most, only partly recognized by a considerable number and fully known to but few. Here is one of the best farming regions of the world, and when it was opened to the growth of the cereals New England and much of other Eastern areas went "down and out." In this area of the Mississippi Valley a little over half of the people of the United States live. Here is 65 per cent of the improved land of the nation. Here is produced about 85 per cent of the country's crop of corn, 65 per cent of the wheat, 78 per cent of the oats, and almost 50 per cent of the cotton. Here also are raised about 65 per cent of the horses, 60 per cent of the dairy cattle, while 55 per cent of the beef cattle, 80 per cent of the hogs and 45 per cent of the sheep of the nation are made ready for the market. Here are obtained about 75 per cent of our bituminous coal, a considerable portion of the iron ore, over 50 per cent of the lead and over 50 per cent of the zinc. This area is also growing rapidly in manufactures and if the lake cities are included now produces almost 50 per cent of the country's manufactured articles.

Topographic Features

Most of this great area which is so rich in resources is without striking topographic features. It is generally level or gently rolling, occasionally hilly, but never mountainous. Much of it appears as a limitless expanse of grove-dotted, gently undulating country, here and there trenched by rivers and surmounted by low hills; or it stretches away as far as the eye can see without either of these relief features—a grass-covered, farm-dotted, smoothly contoured prairie. North of the Missouri and Ohio Rivers it is glaciated. Morainic belts cross it in looped pattern, and between them are notably flat till plains. In that portion covered by glacial ice in the last (Wisconsin) glacial invasion, lakes, ponds, and undrained hollows in great numbers are scattered freely about, stream courses

are disorganized, falls and rapids abound and alternate with swampy depressions often of considerable extent. Most of the area, however, is well drained and well fitted for agriculture. This is shown by the great number of evenly spaced comfortable houses and big barns.

From north to south almost through the center of this area flows the mighty Father of Waters. This great stream, although at times a devastating curse to many inhabitants of the valley, has been of great importance in opening up the country to settlement and has borne many millions of tons of produce to market.

This great valley and its river system present a twofold problem. It has low-water difficulty as well as a high-water peril; it involves keeping navigable depths in the channel as well as keeping navigation off the riparian corn and cotton fields; it associates intimately the interests of navigation and conservation. It is, then, the problem of keeping the system in shape to carry river commerce and of controlling its disastrous floods.

RIVER COMMERCE

Although the lower river is still important as a commercial highway its value to the people of the valley was much greater in the past. New Orleans was established in 1718, but for a decade before this the river had been used as a carrier for furs and for lead from the easily worked mines along the river in Iowa and Wisconsin. By 1740 there were about 2000 farmers along the river in Illinois whose only outlet for their produce was the river. It is true that the early Western settlers could send over the mountain to the Eastern markets the valuable articles of little bulk, such as furs, ginseng or whiskey, or the livestock which could be driven to market. For carrying their flour, pork, tallow, leather and lumber to market they used keel boats and barges.

The steamboat made its appearance on the Ohio River in 1811 and by 1817 had been improved so that it could cope with the currents of the Mississippi and other interior rivers. With further improvements, the steamboat became important by 1822 and river traffic developed rapidly up to 1846 when the output of the lead mines began to decrease. The lead was beginning to go east via the Great Lakes and Erie Canal because the cost was less. The river boats had been having great difficulty especially at the rapids at Rock Island and at Keokuk, which at low-water stages in summer and fall were almost impassable and which often necessitated the reloading of cargoes into barges of light draft which were towed over the rapids with horses.

From 1840 to 1855, in spite of the difficulties of the rapids, etc., the boats reaped a rich harvest because of the large numbers of settlers going into Iowa, Wisconsin, and Minnesota.

The period 1858–1870 is the period of railroad competition, at first helping river commerce, later destroying it.

This period also saw the development of a new type of carrier, the grain barge, towed by steamboats. These were extensively used for about ten years, but about 1870 the railroads had penetrated the grain growing section, and the grain barges soon became almost useless.

Fifty years ago there were 470 steamboats plying regularly on the Mississippi. At the present time, you would have a hard time finding forty-seven, even if you were to count a few government snag and dredge boats to make up the total. In the spring a few big coal tows descend the stepping stones of the Ohio from Pittsburgh to Cairo, and then on down the main

river to the gulf. Near Vicksburg, Memphis and Baton Rouge, a few steamboats come and go on local routes over the waters. Now and then a lone towboat shoving a barge ahead of it disturbs the desolation of the Missouri (once the only artery to the West), and occasionally dwellers near the banks of the Arkansas or Red Rivers hear the whistle of a laboring stern wheeler as she paints their blue skies with a black smoke. River commerce of the present time is of relatively slight importance and along much of the river is largely confined to excursion steamers and sand barges. In fact, the channel is such that after August 1, a boat of six feet draft has great difficulty getting up to St. Louis on the lower river and a boat drawing but four feet of water can only with great difficulty get to St. Paul.

REASONS FOR DECLINE OF RIVER TRANSPORTATION

Two generations ago the Mississippi and its main tributaries were alive with water traffic. Now there is almost none. What are the reasons for this decline? There are several. The Civil War blockade of the lower river by the Confederacy, temporarily stopped down river traffic and helped the railroads in their lead over the river boats, a lead which was not reversed after the war because most of the trade in this section naturally moves east and west, not north and south, and when once started in its natural direction, if even by a temporary cause, is not easily changed. At the close of the Civil War, cheap slave labor to man the boats and load and unload them disappeared. Discriminatory rates by the railroads were also a factor, but the outstanding cause for the decline of the river traffic is that the steamboats could not compete with the new carrier, the railroad, not only in freight costs but also in several other ways. River traffic is limited to a certain natural route. Railroads can be built anywhere. There is no closed season for railroads and their traffic is regular throughout the year, while the farmer who attempted to ship by boat could not tell when to have his stock or produce at the river bank and the yards and storage facilities at the landings were either not there at all or very unsatisfactory. Another factor which was important in causing trade to leave the boats and go to the railroads was the variability of the boat freight rates. In one case the rate during high water was 25 cents per 100 pounds and the low water rate was $2.50 for the same distance.

Also, the difficulties of maintaining a channel are great. There were recently 43 sand bars below Cairo, each with an average length of about 800 feet. At low river stages these come up to within four or five feet of the surface. On the tops of them lie dead trees, anchored by their matted, uptorn roots. These are the bars and the snags, which obstruct navigation at low water. Because of them, big fleets of government snag boats and dredges are maintained. There are 18 high bridges and 25 drawbridges between St. Paul and the mouth of the Missouri River, which also hinder navigation. From New Orleans 110 miles down to the Eads Jettie at South Pass, the river is 100 feet deep, and for 300 miles up river from New Orleans there is sufficient depth for navigation at low water, but the remaining 600 miles to St. Louis requires constant dredging to maintain even an eight-foot channel such as has been done for several years. The 180 miles from Cairo up to St. Louis is one of the worst sections of all.

DESCRIPTION OF THE MISSISSIPPI

We have briefly discussed the use of the river, let us now see what it is

like. The source of the Upper Mississippi is in north central Minnesota in a region which is sprinkled with a multitude of small lakes, and is close to a slight swell of land which separates it from the waters of the Hudson Bay. These lakes lie in a wilderness of evergreen woods and tamarack marshes, of low-lying hills and ridges left by the northward retreating glacier. From a physiographic point of view, the river flows through a valley representing three types of formation. From its source to Minneapolis, the river flows through a shallow or "young" valley. Leaving the small Lake Hernando de Soto through an almost indiscernible outlet, its waters flow through alternate lakes and marshes and over many rapids and falls until it plunges over St. Anthony into the gorge below. In this course of the river, many artificial dams have been built, thus adding to the storage capacity of the natural reservoirs.

Below Minneapolis is found the second part, which extends down the river 888 miles of its course to Cairo, Illinois. For this part of its length, the river flows in a gorge varying from one to six and a half miles in width and with bluffs rising from 100 to 650 feet above the river. These bluffs are not continuous like the Palisades of the Hudson or like the Niagara River Gorge, but stretch along the river on either side "like lines of giant sentinels." This is the part of the river noted for its beauty — "majestic bluffs that overlook the river, along through this region, charm one with the grace and variety of their forms, and the soft beauty of their adornment. The steep, verdant slope, whose base is at the water's edge, is topped by a lofty rampart of broken turreted rocks, which are exquisitely rich and mellow in color — mainly dark browns and dull greens, but splashed with other tints."[1]

Below Cairo, the valley is a level flood plain 50–100 miles wide, with much of this area below water level of the river at high stages. Beginning as it does but 1500 feet above sea level, in the 2555 miles of descent to the Gulf, the river can average a fall of less than six inches per mile. It makes more than half of this descent in the 600 miles from its source to St. Paul, and for the rest of its journey (1950 miles) it falls only three or four inches per mile. With a low gradient goes a low average velocity; nevertheless, the Mississippi River carries down and empties into the Gulf of Mexico every year about 400 millions of tons of mud. To transport this mud by rail would require 500 trains of 50 cars each hauling 50 tons per car, working every day in the year. Thirty-one per cent of the water of the Lower Mississippi is contributed by the Ohio River, 19 per cent by the Upper Mississippi and only 14 per cent by the Missouri, but with the 14 per cent of water of the latter, comes 60 per cent of this silt. The Mississippi River, a few miles above St. Louis at the mouth of the Missouri River, is one and one half miles wide, but from this junction to the mouth of the Ohio, it narrows to about three-quarters of a mile in width. This great tributary seems to diminish the width of the main stream, but as perceptibly increases its depth and volume and alters its character.

DIFFICULTIES OF DOCKING AND NAVIGATION

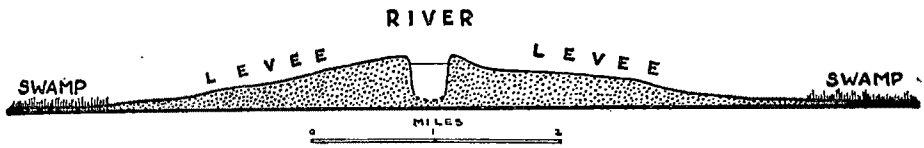
The Mississippi River, then, is very different from one of the type represented by the Delaware or Hudson. Instead of tides of from five to eight

[1] Twain, Mark, "Life on the Mississippi." Harper & Bros.

feet which do not seriously interfere with docking or navigation, on the Mississippi River we have stages varying through a range of 54 feet between high and low water at Cairo, Illinois, and almost as much at many other cities. At a point about a mile below this city in the extreme southern point of Illinois, the Ohio, normally about a mile wide, and the Upper Mississippi, half a mile wide, flow together. The river, especially from this junction down, which is really the trunk line portion of the system, is made up of a series of wide curves, and loops which are called oxbows. When the narrow strip of land, between the upstream and downstream sides, of one of these loops is washed away, the river takes a short cut and leaves a crescent shaped lagoon or bayou. "These cut-offs have had curious effects: they have thrown several river towns out into the rural districts, and built up sand bars and forest in front of them. The town of Delta used to be three miles below Vicksburg; a recent cut-off has radically changed the position and Delta is now two miles above Vicksburg."[2] In another part of his book, Mark Twain states that, "In the space of one hundred and seventy-six years, the Lower Mississippi has shortened itself two hundred and forty-two miles." Using this as a basis of computation, he rather facetiously writes: "Any person can see that seven hundred and forty-two years from now the Lower Mississippi will be only a mile and three-quarters long, and Cairo and New Orleans will have joined their streets together, and be plodding comfortably along under a single mayor and a mutual board of aldermen." So crooked is the river's course that, although the channel distance from Cairo to the Gulf is 1200 miles, the air line distance is only half as far. Instead of rock as is found along the banks of a river like the Delaware or Hudson which affords good foundations for factories and wharves, the Mississippi's banks, especially along the lower part of its course, are fine sand, silt or gravel, which almost dissolves when it gets wet. From St. Louis to Cairo, bed rock (within the gorge) averages 50–150 feet below water level, while below Cairo it is much deeper down. There are, therefore, almost no factory sites on the water front on the Lower Mississippi and wharves are hard to build and maintain. The discharge of a river like the Delaware or Hudson remains relatively constant through the year, while that of the Mississippi River varies from about 70,000 cubic feet per second at low water to 2,300,000 at high water stages.

We must keep in mind that the material upon which the river is flow-

[2] Twain, Mark, "Life on the Mississippi." Harper & Bros.



PROFILE OF THE MISSISSIPPI RIVER AT BELLE POINT

ABOUT 50 MILES ABOVE NEW ORLEANS. SHOWS NATURAL LEVEES AND HOW WATER WOULD POUR OUT INTO SWAMPS ACROSS THE OCCUPIED AREAS ON THE LEVEE SLOPES IF A BREAK SHOULD OCCUR.
(VERTICAL SCALE EXAGGERATED)

ing was carried there by itself or its tributaries. Sediments brought by the streams from the higher lands were deposited and gradually the alluvial flood plain was built up. The coarsest and heaviest sediments were deposited first along the borders of the stream and the finer material was carried out and deposited farther away. Continued deposition of this type following repeated overflows causes the land to be built up rapidly near the streams and slowly in the inter-stream areas so that the surface is highest near the river and gradually slopes away from it (see profile). This accounts for much of the poorly drained areas away from the river and the early settlement along the slopes and natural levees, while the back areas were still unoccupied. The material of the natural levees being unconsolidated is very easily eroded.

DANGER CAUSED BY CHANGES IN THE CHANNEL

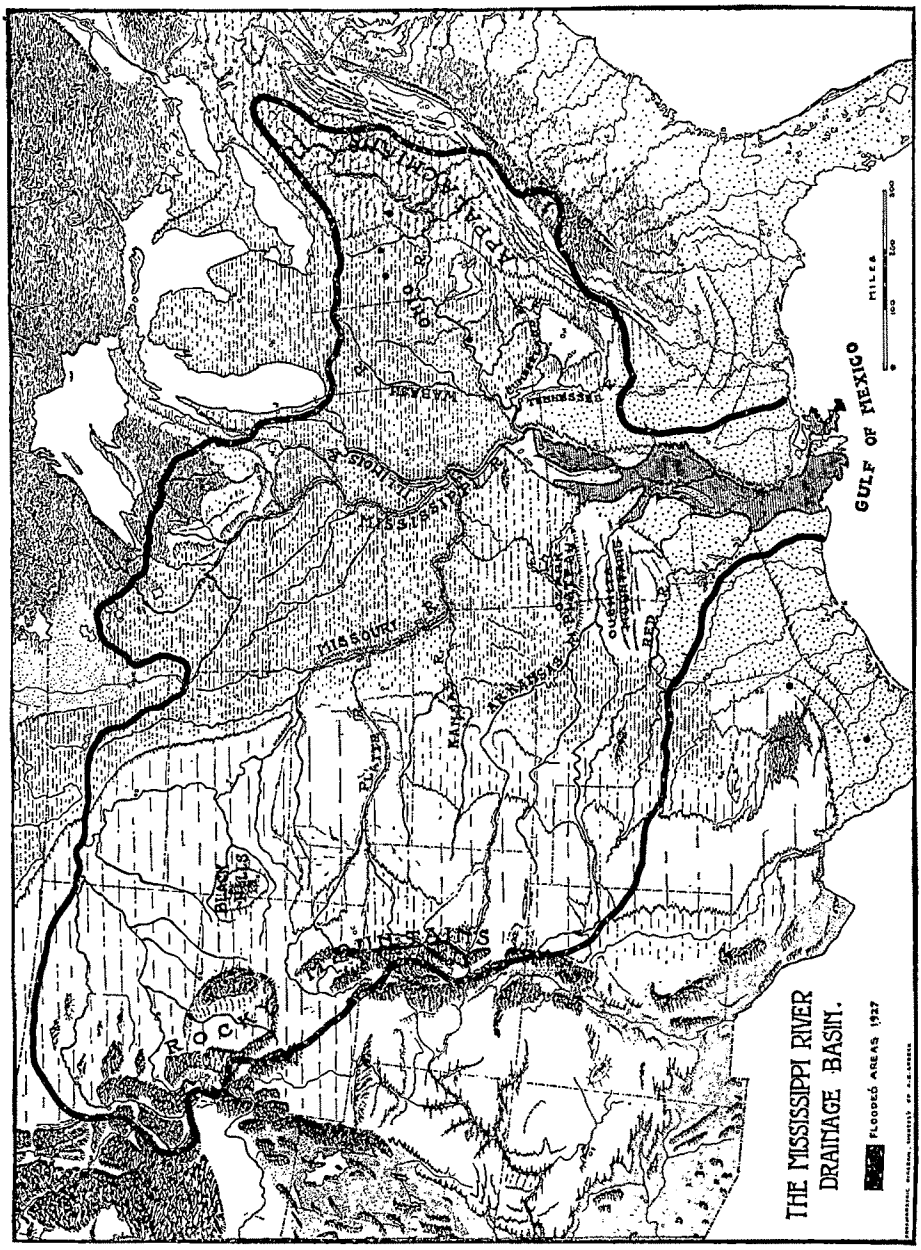
On every one of the many turns and bends throughout the whole 1200 miles, the river is constantly undermining and wearing away the outer bank of the channel in much the same way as the outer rail of a curve on a railroad is worn rapidly and must soon be replaced. The fine-grained, loose character of the soil, greatly facilitates the undermining action, especially during the irresistible rush of flood waters.

This habit of eating away its banks is perhaps the worst thing which can be charged against the Lower Mississippi, and presents one of the most serious problems in the whole question of control. Needless to say, the unceasing changing of the course is vitally important to the plantation owner, who sees his fertile land steadily vanishing, often at the rate of 400 or more feet a year along his entire water front. It is still more important to the towns and shipping points located along the river. New Orleans is the only big city located directly on the river flat, and, fortunately for the city, it is at a place where the river's course is now comparatively straight. Other cities, like Memphis, Vicksburg and Natchez, are located on the high bluffs where the river swings close against the eastern side of its valley. These latter towns have secured immunity from floods, but even simple changes in the channel would deprive them completely of their water fronts and strike fatal blows at their prosperity.

Even the present extent of the river traffic demands that there shall be more or less villages directly along the river and steamboat landings at various points, but every one of these places enjoys only a temporary existence. Since the river current hugs close along the outer side of every curve in its course, it follows that the deepest water, and hence, the main channel, also lies near the outer bank. The natural result is that all steamboat landings and all important shipping points must be located on the outer banks of curves, as is found to be the case all along the river. The difficulty which lies therein is obvious enough, for with rapid undermining of the outer bank of all bends, the river is always tending to destroy the water front of every place so situated. The history of the landings below Cairo shows that practically every one of them has been driven back before the advancing river at the rate of 100 to 150 feet per year for the last quarter of a century.[3]

Much money and time have been spent on attempts to keep the river navigable. Trees and snags are removed; loose, slipping banks are protected by revetments of willow, boards or other material; and wing dams are built in order to narrow the

[3] Tower, W. S., "The Mississippi River Problem"; Bulletin of the Philadelphia Geographical Society, Vol. 6, 1908, p. 87.


THE MISSISSIPPI RIVER
DRAINAGE BASIN.
FLOODED AREAS 1927
GULF OF MEXICO
MILES
ROCKIES
OZARKS
ALLEGHANIES
MISSOURI R.
MISSISSIPPI R.
OHIO R.
ILLINOIS R.
TENNESSEE R.
ARKANSAS R.
RED R.
PLATTE R.
BIG HORN MTS.
BLACK HILLS

channel and cause greater depth in the Ohio and Upper Mississippi. These have proven only partially successful. There are many who believe that the Mississippi River will again become a great highway of commerce and argue for a 14-foot channel from Chicago via the Illinois River and the great river to the Gulf. A barge line was started in the summer of 1927 on the Mississippi above St. Louis. It will be some time before we can predict success or failure for this and other traffic programs planned to renew transportation on the river and its tributaries.

FLOOD CONTROL

The second great problem of vital interest to those living on the flood plains of the Mississippi and its tributaries is that of flood control. The great flood of 1927 — the most distinctive of all — was one of some fifteen very serious floods that have occurred in about 50 years. Fernando de Soto's party found the river at flood, and many seasons of high water have been known since, notably those of 1785 and 1844. Although the people who live in the valley of the Mississippi have many valuable resources, they also have a continental climate, usually changeable, but sometimes very erratic. Untimely rains, combined with melting snows or a long period of wet weather, followed by heavy rains over much of the valley, cause high water in the flood plain areas.

It should be emphasized that the area affected by floods is only a small part of the Mississippi Valley (shown by accompanying map). It is advocated by many that parts of the area so often submerged and so sparsely populated should be abandoned and all efforts be combined on attempts to protect the more populous and prosperous areas. If loss of life can be prevented, this would seem logical, for there is no more reason to ask the Government to protect an area subject to overflow and whose owner takes a chance than to ask that same Government to protect from drought or frost. However, the Mississippi is the great drainage artery of the Mississippi Valley and as such must ever be of great interest to the inhabitants of most of the area between the Alleghany and Rocky Mountains.

The Improvement of Our Mid-West Waterways

By Hon. Herbert Hoover[1]
Secretary of Commerce

In the past three years I have addressed many in support of further development of our inland waterways. In fact the Secretary of Commerce is enjoined by the organic act creating that office to foster and promote the development of transportation. It is a subject that can interest only the serious-minded, for any contribution to public thought must be by economic reasoning, not by oratory.

I am concerned with this improvement because it will contribute to the wealth and economic progress of every section of the Union. It will contribute to the unity of the nation. It is of concern to every one of our millions of farms and homes. The Mississippi Valley Association, representing all parts of the Mid-West, has been long devoted to the promotion of flood control and inland waterways; it has a record of great accomplishment. But the work is far from complete, and that work and mine requires that we should formulate and support plans not only for tomorrow but with vision of the distant future, for the day is here when we must look to the welfare of not alone 115,000,000 Americans of our generation, but we have a responsibility toward the 150,000,000 Americans who will be living in our children's time.

Mississippi Flood Control

The most important event in our national life during the past year has been one which bears directly upon the development and control of our great rivers—that is, the Mississippi Flood. Sad and heartrending as it has been in its human aspects, severe and discouraging as have been the economic losses, it at least serves to bring home to the American people the increasing dangers to a growing population which lurk in our great streams if they be not adequately controlled.

I had the honor to be chosen by President Coolidge to organize and direct the relief activities which were supported so generously by our Government and the people at large through the Red Cross. No man could occupy that responsibility and have witnessed its scenes without being deeply moved to the human necessity of immediate and final prevention of its ever recurring again.

I have little need to dwell upon the causes of the great flood and its destruction. But there is an aspect of the flood that has perhaps not been sufficiently emphasized. The destructivity of this flood was partly due to the rapidly increasing settlement of the flood area. This increase will continue, and such dangers to our country will increase as years go on unless we establish adequate controls. The great delta of the Mississippi River, which in reality extends from Cairo to the Gulf, has been for untold centuries the spillway for our interior rivers. They spread their annual floods over these richest of alluvial lands for a thousand miles long and from 20 to 150 miles wide. With the pressure of population, our people have, more especially

[1] An address before the Mississippi Valley Association, St. Louis, Missouri, Monday evening, November 14, 1927.

Seldom do we reprint addresses in *The Annals*. But this address is too good to miss.—C. L. K.

in the past quarter of a century, invaded the flood region. With courage and resolution they have overcome the swamp and forest, they have converted it into homes and productive farms. And in so doing, they have of necessity crowded out the annual floods with peace until finally they have forced the river in flood time to confine itself to its own channel.

I need not recount to you that, with the unprecedented volume of water of this year, these barriers crumpled up and the river spread itself again over its old flood area. Some 750,000 of our people were compelled to flee their homes in jeopardy of their lives. Damage to their farms and villages amounted to hundreds of millions.

Such a flood 25 years ago would have wrought far less destruction simply because there were fewer people and less property in its track. If we look into the future but a quarter of a century, we can envisage even far greater dangers than those past. We may not have so great a flood again for many years to come. But the richness of these soils and the pressure of our growing people will some day see 5 or 10 million of them settled under these levees. No one can contemplate these millions of our fellow citizens living in such jeopardy without adequate and final protection.

I believe the whole of the United States is unanimous in that we must undertake such engineering works as will give security—not only now but for the future. Our people have arrived at this conclusion because of their warm sympathy for the welfare of their fellow citizens. But, viewed from the more narrow point of view, the destruction of property is the loss of the entire nation—it is not solely the loss of the individual sufferers. The loss of several millions of acres of crops in this flood deprived the American people of just that much goods which they might have otherwise consumed or exported, and again every worker and every farmer in our country to some degree was a loser through the decreased buying power of flood sufferers themselves. Every investor in railways and industry of the South lost something.

Our able engineering staff under the leadership of General Jadwin will in a few weeks have consummated their plans by which these floods can be controlled. And it devolves upon my colleague, Secretary Davis, to present them to Congress as the basis for legislation.

I am confident of the outcome that we shall as a nation within the next few months have taken such action as will not only give assurance of safety to the whole of our fellow citizens in the flood territory, but that will give such security as will guarantee the continued development of this great region.

INLAND WATERWAYS

But, in our necessity to remake and energetically construct such flood control works as will guarantee protection against these calamities, we must not be diverted from our march to the improvement of our inland waterways. That is as important to the suffering flood states as it is to our people elsewhere. Indeed, we have made great progress in the past year in this great improvement of our national estate, both in actual construction and in advancement of public support.

It is perhaps unnecessary to recount that every great national development in transportation must pass through many stages. There must be a situation to be remedied, there must be compelling cause for action; there must be a determination of the remedies that are available; there must be a definite plan conceived; the works must be constructed; and finally they must be used.

THE SITUATION TO REMEDY

The urgency of the situation to be remedied, to a large degree, grows from the economic shifts due to the war which have brought a new setting to all our mid-Continent. The necessarily large advance in our railroad rates as a result of higher wages and cost of materials since the war serves to set a row of tollgates around the Middle West. There is thus a charge, new with the war, against all goods coming into the Mid-West and all goods going out. It is not as if all parts of the country and all parts of the world had been placed under a similar tax, for that is not the case.

You will find that ocean rates have returned to a prewar basis—and thus the folks of seaboard countries do not pay these additional tolls to and from market, and therefore they have today a greatly increased competitive advantage over their fellows in the interior. This, together with the completion of the Panama Canal, the full effect of which was not evident until after the war, all combine to distort the economic setting of this whole Mid-West.

Mid-West agriculture and Mid-West industry have been placed in a new relationship to different parts of our country and to the world markets as a whole. If we would restore these former relationships, we must find fundamentally cheaper transportation for our grain and bulk commodities which we export and the raw materials which we import into the Mid-West.

I can possibly make this problem of economic shifts more clear by example: a great part of the agriculture which competes with our farmers lies to a considerable degree in Argentina, Australia, Eastern Europe and India. Those agricultural areas are all nearer to seaboard and their ocean rates to the common markets remain the same as prewar, while our rail rates to seaboard on wheat, for instance, have increased about 8 to 18 cents per bushel. Therefore foreign farmers reach European markets at a less cost in proportion to prewar than can our Mid-West American farmer. In actual figures, the competing farmers from the Argentine, for instance, have felt an increase in rates of only 2 cents per bushel.

I believe there is general agreement that the cost of transportation is a deduction from the price the farmer receives at the world's markets—and besides that the price at which he realizes his surplus in foreign and seaboard markets makes the price of his whole product at home, so that the effect of increased transportation rates to these markets is far greater than the bare amount as applied to exports only. It is an enormous sum when applied to our crops and is one of the contributing causes of the farmer's postwar difficulties. It is not all the farm problem, but it is a substantial part.

While the Panama Canal has carried great benefits to our people, we cannot ignore the fact that it has also contributed to distort the competitive relationships of the Mid-West and our seaboard business and industry. It has drawn the East and West seaboards much closer together by greatly decreasing transportation costs and therefore tends to draw an area of Pacific's business formerly enjoyed by the Mid-West toward the Atlantic States. We can roughly visualize the combined effect of the canal and higher rail rates if we set up a new measuring unit in the shape of the number of cents which it takes to carry a ton of staple goods at present rates. Using that measuring rod and taking the cheapest routes, we find that before the war New York was 1904 cents away from San Francisco, while now it is only 1680 cents away. But a given Mid-West point, which

was 2600 cents away from the Pacific Coast before the war, is today 3114 cents away. In effect this Mid-West point has moved 514 cents away from the Pacific Coast while New York has moved 224 cents closer to the Pacific Coast. A similar calculation will show that in the same period this Mid-West point has moved 694 cents away from the markets of the Atlantic seaboard and South America.

All this causes certain types of Mid-West business to migrate to seaboard. It steadily tends to establish manufacture nearer to seaboard and farther from the heart of agriculture, to the mutual disadvantage of both. It likewise has a tendency to limit the area of Mid-West wholesale distribution. Individual merchants and manufacturers in the interior can give you many instances of it all.

From all this serious shift in economic currents in its effect on agriculture and upon business we surely have something worthy of our best effort in remedy. And remedy lies as I have said in finding cheaper transportation in bulk products of agriculture and in raw materials.

THE REMEDY

With the higher cost of labor and materials, we cannot expect any consequential reduction in our railroad rates without ruin to that vital circulating system. Our railways have reached the highest efficiency in their history, and we must maintain them in that condition. We cannot close the Panama Canal. Nor can we raise Atlantic Ocean and other sea rates, because the standards of living in the rest of the world, unlike our own, have not increased over prewar, and therefore the cost of operating foreign overseas shipping is not far from a prewar basis.

In any examination of our country for remedy, we have naturally turned to a consideration of the magnificent natural waterways which Providence has blessed us with. It is therefore our conception that we should deepen our rivers to permit modern barge transportation, deepen the outlet to the Great Lakes to permit ocean-going shipping, and to connect them all together into a definite transportation system.

THE PLAN

Your Association has for long years steadily fostered and forwarded the development of inland waterways. But the national mind perhaps, until in the past two or three years, has conceived waterways development as local projects of some immediate near by improvement, instead of in the wide vision of a comprehensive system of 12,000 miles of connected inland water transportation reaching from the Gulf to the Northern frontiers and from the Lakes to the Atlantic Ocean.

The plan can be simply stated:

It is to deepen the 9000 miles of the Mississippi and its tributaries to minimum depths of 6 to 9 feet so as to permit modern barge service—that is, the Mississippi system.

The construction of the St. Lawrence shipway from the Lakes to the Atlantic, thus opening every lake port to the vessels of the world over 3000 miles of deep waterways—the Great Lakes system.

There are other important waterway improvements of less size which bear directly and indirectly upon the Mid-West. The stabilization of lake levels and deepening of the channels so as to permit full ship loading within the Lakes, the intracoastal waterways and the continuous development of our harbors are all works which must go forward some time but are not our particular subject tonight.

During the last year we have made

great steps in progress of these plans and in the consummation of some of them. Congress has authorized the remaining unfinished links in the Mississippi system. It has increased appropriations available to $20,000,000 per year for their execution. If these appropriations continue we should see the improved Upper Ohio linked with the Lower Mississippi in another two years. We should see the Missouri steadily deepened to Kansas City and as far above as traffic warrants. Already barge navigation has begun upon the Upper Mississippi to St. Paul and Minneapolis. I am in hopes that in not more than five years we shall see Chicago connected to the Mississippi and thereby with the Gulf by a nine-foot channel. By these works and the gradual improvement of channels up the other tributaries as traffic warrants, we shall at last replace a series of disconnected segments of river improvements into a great transportation system.

Curiously enough, I find that some of the press in outlying parts of the country still have the lingering notion that we are trying to restore the romantic steamboatin' days with gay river steamers whistling down the reaches, with possible Mark Twains aboard. I am not adverse to romance when it can be had without cost to the taxpayers. What we are trying to do lacks that color, but carries much more freight. What we want is to deepen our streams so that they become unfailing channels for flocks of steel barges, shepherded by puffing tugs. It lacks splendor and the glorious adventure of the olden days, but each flock will carry at a single trip from 4000 to 16,000 tons—more than say fifty old-fashioned packet boats or more than five modern freight trains. It is no doubt the drab toil of modern commerce, but in this bulk and in this mobility of units which can be sent to different destinations do we realize modern river transportation and modern mass handling of commodities on our inland water.

Two years ago I was able to promise that this traffic and these benefits would flow as soon as we had connected up the segments of this great Mississippi system. But in so short a time as two years the demands upon even the disconnected segments have grown beyond the capacity of our equipment and already we begin to see a complete confirmation of our assurances. Last year over 10,000,000 tons of commodities moved on the Lower Mississippi and nearly 20,000,000 tons upon the Ohio. The present gap in the connection of these great segments is just as if a stretch of narrow gauge line were introduced into the New York Central main line.

Recent delegations of shippers to Washington showed that there are hundreds of thousands of tons more unable to move because of insufficient equipment on the river—and we must bear in mind that we have not yet felt the effect of the fully developed system for such great centers as Kansas City, Chicago, Pittsburgh, Cincinnati, and Louisville and their hinterlands are not yet connected either with each other or with St. Louis, Memphis and New Orleans.

This should settle once and for all the contention of our critics that there was no demand in goods to be moved upon the rivers.

A component part of our inland system is the Great Lakes. In them we have the mightiest inland waterway given to any continent. They bore last year over 115,000,000 tons of traffic.

But the full influence of the Great Lakes system in remedy to the economic difficulties of the Mid-West is

dependent on the deepening of the channel of the St. Lawrence River to permit deep-sea shipping from the Great Lakes into every port of the world. The consummation of such an undertaking would represent the final step in 150 years of battle for the removal of barriers in this great waterway to the Mid-West. It would give an effective outlet for eighteen of our states to the North Atlantic.

The Joint Board of Engineers have submitted to their two governments their report upon this work. Their conclusions were that this route is the most beneficial and efficient one, by large margins the cheapest to build and operate. In accord with the compelling interpretation of the facts, our American Commission, of which I have the honor to be chairman, has recommended that its construction be undertaken.

Some months ago we requested the Canadian Government to enter these negotiations. However intricate the questions may be which are involved in these international relations, I am confident that they can be solved upon the ample foundations of broad mutual interest and good-will which have signalled our two nations since our birth. We have for a century coöperated with each other in constant improvement of this great highway. It has been part of our joint endeavor in the development of the new civilization on this Continent. This final step is a task worthy of the strength and purpose of the two sister countries who have in two centuries already overcome countless obstacles in implanting the most helpful civilization of history.

THE OPPOSITION TO WATERWAY DEVELOPMENT

You will find three main schools of opponents of the vigorous development of our water transportation—first, those who doubt that it will yield the economic benefits which we assert; second, those who feel that it implies undue burdens upon our taxpayers; and, third, those who fear that these developments might injure our magnificent railway system.

The question is whether anyone of all of these projects are justified. We are no longer on theoretical grounds when we assert that Mid-West transportation of bulk materials will be cheapened by these means. We have the actual beginning of experience. During the past year we have seen the Government barge line operating successfully upon the St. Louis-New Orleans segment with a rate down river on wheat about 8 cents a bushel less than by rail, and a rate up river on imported commodities of as much as 10 cents per hundred pounds less than by rail. During the past few months we have seen the barge line extended to St. Paul and Minneapolis, 12 cents per bushel lower by water than by rail, and we have seen the up river rates on coffee and sugar 16 cents per hundred pounds less than by rail.

While we can point to these benefits, we shall not come into full realization of these services even on the Lower or Upper Mississippi until we have completed the other segments of the system. It is only then that we shall have diversified our traffic, established reserves of equipment, felt the benefits of private enterprise, which will give us the full values of cheaper transportation costs.

I believe that the statement often made that, by the modernization of the Mississippi and the Great Lakes systems of waterways, we shall decrease the freight on grain to the world markets by 10 cents a bushel is not far wrong. And by so doing, we should increase the price of all grain to the farmer by 10 cents per bushel, and this 10

cents is the profit end of the price. One single year of such increase to our Mid-West farmers would more than equal the entire capital outlay which we propose. I doubt if since the days when we transformed transportation from the wagon to the railroad have we seen so positive an opportunity to assist the prosperity of our people.

As to those who complain of the capital cost upon our taxpayers, it may be recalled that no great engineering projects can be consummated in a year. The completion of these projects are spread over from two to ten years, even if they were all authorized tomorrow. I dare say the whole of our water transportation projects I have mentioned could be accomplished with an increase in our present annual expenditure upon rivers and harbors of 20 millions a year. That a nation with an annual income of 90 billions can undertake to spend a tenth of one per cent of its national income in such works requires little argument. Upon this point we can do no better than quote the most successful statesman in economy in our national history—President Coolidge—who in his last message to Congress said, in referring to these very projects: "Expenditure of this character is compatible with economy. It is in the nature of capital investment."

Another criticism to which I have given great consideration is that the opening of these great waterways would endanger the stability of our railway system. Taking the country as a whole, the railways must ever bear the major burden of our goods traffic. And there are many classes of goods which will always go by rail even parallel with the waterways. And here is an old saying that is true: "New transportation facilities create business." It is well proved by our new highways.

At one time in our history we practically abandoned the highways and waterways for the railways. The invention of the gas engine has restored our highways and multiplied their traffic ten thousandfold. Yet the total volume of passengers and goods on our railways has increased threefold in 25 years; the next quarter of a century promises even a larger addition to our population than the last 25 years. The railways must provide for the major burden of this increase, and I believe most railway operators agree that our railways can well be supplemented in their provision for this increased traffic by fully developed waterways. I have no fear for their prosperity.

NATIONAL ORGANIZATION

There must lie before us constantly the necessity to so organize these projects as to accomplish them with rigid economy and high efficiency. I am convinced that we have come into an entirely new era in the development of our water resources and therefore we should give thought to the whole basis of our governmental organization which bears upon control and execution of these developments, if we would have economic and efficient execution; if we would confine ourselves in rotation to the works most urgently needed; and if we would do justice by private enterprise and our taxpayers. One of our difficulties in the past has been to secure well-thought-out plans and policies in the development of our multitude of different water resources. And even when plans have been adopted we have incurred unpardonable wastes of money through lack of continuity in action. We need public understanding that appropriations for these projects must go through to completion or that they should not be undertaken.

Another of our problems requiring immediate consideration is the increase of equipment upon the river. We need to develop this question in such fashion

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that it shall ultimately be taken over by private enterprise because in the long run it is through private competition only that we will have efficient use of the waterways. The Government undertook to pioneer the equipment for a modernized river through the barge line. The pioneering stage is not over and may not be over for some time. We must devise ways and means of larger equipment and devise the program for its ultimate taking over by private enterprise.

A further problem presents itself in that modern investment and our increase of population have introduced many new and complex factors into the planning and construction of some of these water improvements. So long as we are concerned solely with improving navigation upon our streams, the organization and administrative problems are comparatively simple. It is a function assigned to the Federal Government and administered by one Federal agency—the Corps of Engineers. But today on many of our streams we have other problems besides navigation. There is flood control, reclamation and irrigation which will loom even more largely 20 or 30 years hence when we shall want more land. We have problems of water distribution and water rights and domestic water. Beyond this, private agencies are engaged in electrical power development under government permit.

The most casual study of this subject will show that every different river in the United States has possibilities of development in from one to five of these particulars. Often enough these different interests conflict. The unit of development must be a drainage basin if we are to secure the full values from these our noblest resources.

Now if you will study our Federal and State governmental agencies that have authority in these questions, you will find a most appalling lack of coordinated action. In our Federal Government relations to these problems of navigation, flood control, power, domestic water, reclamation and irrigation lie in four separate agencies of the Government. You will find that within our State governments we deal with these questions by from two to five different agencies. You will find also that county and district organizations —many of them—have authority on these questions.

Beyond this you will find that often enough from two to twenty states are interested in a single drainage. In other words, I have found it possible to compute that as many as thirty different independent governmental agencies may be interested in the development of a single drainage.

There is at times bitter conflict between these agencies, and between states. I could take much of your time illustrating the friction which has grown up—the litigation which fills the courts and the conversion of these technical problems into politics with all of its inability to solve what are fundamentally engineering questions. We have in many cases abandoned the pouring of cement in order to pour out our emotions.

I need cite no greater instances than the Colorado River, the Chicago drainage diversion and even the Mississippi Flood, because the sacrifice of flood control to reclamation has been one of the contributory causes of that disaster.

I am not one of those who believe that we should ruthlessly uproot institutions, services and relations between our states and the Federal Government in order that we may attain a paper perfection in plans of organization. What we really need is that we should build within these agencies the necessary links of coördination in such manner as will maintain both our local

government and national responsibility yet secure the coördinated development of each drainage.

Two years ago I made a tentative suggestion upon which every event since that time has brought further confirmation as to its necessity. That was that we should create separately upon a half dozen of our great drainages, where multiple problems occur, advisory commissions on which not only the various branches of our Federal Government should be represented, but that the time has come when the State governments concerned should be represented and where necessary local authorities should also have a voice; that it should be the duty of these advisory commissions to determine broad policies upon which the development should take place, that they should develop plans by which the different agencies of navigation, flood control, power, reclamation and irrigation and domestic water should proceed; that they should determine the economic urgency of the different segments of such plans. We have already in the Mississippi and St. Lawrence Commissions a start upon this basis of organization the former having to do with flood control alone.

I am not proposing any additional engineering staff. The material already collected and the large number of surveys ordered by the last session of Congress are a long stride toward the full provision of technical data. I do not propose that the new commissions should have any administrative authority—their only task should be to present the plans they formulate to Congress, to the states and to the public at large. Once our legislative bodies have taken action, then the task of construction and operation should be left to responsible departmental agencies or private enterprise and not to boards or commissions.

These administrative suggestions are not proposals for centralization of government but decentralization; they are not proposals to displace the authority of Congress, but to assist an already overworked body; they are not proposals of more than trivial expense, but safeguarding from the waste of hundreds of millions in ill-planned development and loss of our full water resources.

CONCLUSIONS

I have stated on another occasion that the consummation of these beneficent projects are the greatest engineering undertakings of our history. They are more than that—they are undertakings worthy of the effort of mighty nations. There is nothing that so lifts the spirit, the ideals and the faith of a people as confidence in their ability at great undertakings and the proof of this ability through fine achievement. It is the sort of display of national might and greatness which advanced courage of men. There is nothing that should so appeal to the imagination of our people as the rediscovery of the resources of our continent through the application of the great tools science has given us. It is a sore need of the vast inland empire whose populations have a right to every contribution that can be made to their welfare and their prosperity. In the distribution of recovery from the war, our industrial sections have been more fortunate than the agricultural sections and their situation needs be met with no narrow spirit.

The development of our waterways will enlarge the wealth and income of all our people, will make for better homes and happier lives. It will further consummate that fine promise in the Constitution "to create a more perfect Union."

And, finally, I may again recall a statement of President Washington in

recounting one of his pioneering journeys to this same Mid-West. He said this: "Prompted by these actual observations, I could not help taking a more contemplative and extensive view of the vast inland navigation of these United States, and could not but be struck with the immense diffusion and importance of it, and with the goodness of that Providence, which has dealt her favors to us with so profuse a hand. Would to God we may have the wisdom to improve them."

If we in our generation have so great a vision as the Father of Our Country we shall do it.

The Report of the Committee on Mississippi Flood Control Appointed by the United States Chamber of Commerce

By Frederic A. Delano
Chairman, Washington, D. C.

THE salient points of this Committee's report and its conclusions are:

(1) To begin with, the Committee attempted to make a catalogue of the floods which have occurred in the last 200 years. During 150 years of that time, one must depend upon somewhat indefinite historic records, accurate enough, however, to indicate that as often as every ten years or so these floods were very serious. Since 1879, the year the Mississippi River Commission was created, precise data have been available. These show that there have been in the last fifty years seven floods in the main river which were serious enough to be characterized as important.

(2) The seriousness of these floods and the resulting damage have satisfied the Committee that the work of protection has been inadequate either in its conception or execution. In trying to satisfy itself upon this point, the Committee came to the conclusion that a work of such magnitude must be under a centralized control with a single responsibility for its maintenance as well as construction. It has been stated without contradiction that even in this last terrific flood, no levee constructed under the present specifications of the Mississippi River Commission has given away; that the levees which have given away were levees which were either faulty in construction, inadequate in height and strength, or were not so protected with revetment as to withstand the terrific onslaught of this flood. The lack of centralized control has naturally led to waste, so that not only have the communities greatly suffered in each flood period, but much of the work that had been done has been thereafter largely undone.

(3) It became evident to the Committee that the work of control, adequately conceived and properly centralized, must be undertaken on a continuing basis. The commission undertaking the work must approach the subject as any great engineering construction must be undertaken, as, for example, the Panama Canal. A general method of dealing with the project must be agreed upon, the work must go forward and funds be made available on a progressive basis. Because the work requires in some cases special and heavy machinery, contracts must be let, the execution of which will require at times two or three years. In no other way can we deal with so great a problem either effectively or economically.

(4) A difficult angle of the problem presented itself when the Committee considered the limitations of the work which it was ready to recommend to Congress should be undertaken solely by Federal authority. The Committee's recommendation that the work should be under Federal control has already been explained, but the justification for that recommendation lies largely in the fact that the lower

Mississippi River (between Cairo and the Gulf) drains the water from thirty-one states. This part of the river may be termed the *main trunk line sewer* for 60 per cent of the area of the continental United States. It is so none the less because it receives a large precipitation within its own immediate drainage area. This vast drainage system cannot be considered as a local matter, and yet if you undertake to enlarge it by demanding that the control of the Federal Government shall include some of the tributaries, for example, the upper Mississippi, you at once get into trouble, for there is no more reason why the Federal Government should protect the upper Mississippi River in which five states are involved, than it should protect any other interstate stream. The same is true of the Ohio River, the Missouri, the Arkansas and the Red River.

(5) It was evident that a serious flood in the lower Mississippi River not only operated to destroy commerce upon the River itself for a considerable period of time, but what was far more serious, it destroyed interstate commerce by rail and highway along the River and across the valley over a very wide extent of country.

(6) Finally, your Committee strongly recommended in its report that the work of flood control should be considered by itself, not associated with any other projects however meritorious; that it should be put in the hands of a highly competent commission, with the most competent engineering staff available. Incidentally it should be said, this is not in any sense a criticism of the Mississippi River Commission or of the Engineer Corps of the Army, both of which have done excellent work with conditions and limitations what they were.

With this explanation it will be readily understood why the Committee made to the Chamber four major recommendations which are now being considered in a letter ballot by the entire membership:

I. That the Federal Government should hereafter pay the entire cost of constructing and maintaining works necessary to control floods of the lower Mississippi River. (For purposes of this report from Cairo to the Gulf.)

II. That the Federal Government should assume the sole responsibility for locating, constructing, and maintaining such works.

III. That there should be an adequate appropriation to insure efficient, continuous and economic work, the funds to be available as needed.

IV. That flood control of the Mississippi River should be dealt with in legislation and administration upon its own merits, separate and distinct from any other undertaking.

The report of the Committee[1] follows:

[1] The members of this Committee were as follows:

PERSONNEL OF COMMITTEE

DELANO, FREDERIC A., *Chairman:* Engineer, of Washington, D. C.; formerly a railroad executive and president of the Wabash Railroad; appointed a member of the Federal Reserve Board upon establishment of the Federal Reserve System, resigning in 1918 to enter Army; on staff of the director general of transportation in France; recently receiver for the United States Supreme Court in Red River Boundary Case.

LAMONT, ROBERT P., *Vice-Chairman:* Manufacturer, of Chicago; president, American Steel Foundries; director, First National Bank of Chicago, Armour and Company, etc.; during war, chief, procurement division, Ordnance Department; member, Chicago Association of Commerce, and

THE COMMITTEE REPORT

To the Board of Directors of the Chamber of Commerce of the United States:

Your decision to appoint this special committee was made at a time when the Mississippi River was in the midst of one of its most destructive floods. The interest of the American people was at its height, and the fullest measure of sympathy was being extended to the stricken people in the Mississippi valley. All means of aid were being considered and organizations were being perfected to extend such aid and give relief. It is inferred from the wording of the resolution passed at the annual meeting of the National Chamber in May, dealing with conditions arising from the Mississippi River flood, that any phase of this problem which the committee might consider appropriate for Chamber action should be studied.

The immediate and generous response of the American people to the President's appeal for funds has, under the very prompt and efficient work of the American Red Cross in the relief of suffering, prevented epidemics and furnished food and shelter to the people whom the flood suddenly bereft of their homes, cattle, and other possessions.

Before the flood waters had begun to recede, steps had been taken toward rehabilitation.

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formerly vice-president, Illinois Manufacturers Association; director, Chamber of Commerce of the United States.

BENT, ARTHUR S.: Engineering contractor, of Los Angeles, California; senior partner, Bent Brothers, and president, California Glazed Cement Pipe Company; formerly president, Associated General Contractors of America; director, Chamber of Commerce of the United States.

BUTTERWORTH, WILLIAM: Manufacturer, of Moline, Illinois; president, Deere and Company; formerly president, National Implement and Vehicle Association; vice-president of the Chamber of Commerce of the United States for the northern central states.

COUCH, H. C.: Engineer, of Pine Bluff, Arkansas; president, Arkansas Light and Power Company; vice-president, Bankers Trust Company, Little Rock, Arkansas; chairman, Arkansas Farm Credit Company; national councillor for Pine Bluff Chamber of Commerce in United States Chamber.

DICKINSON, JACOB M.: Lawyer, of Chicago; formerly Secretary of War, president of the American Bar Association, receiver for Rock Island Lines, etc.; vice-president, American Society of International Law.

ELLIS, ROBERT R.: Wholesale merchant, of Memphis, Tennessee; president, The Hessig-Ellis Drug Company; formerly president, Memphis Chamber of Commerce; vice-president of the Chamber of Commerce of the United States for the southern central states.

HINES, WALKER D.: Lawyer, of New York City; president, Cotton-Textile Institute; formerly chairman, board of directors, Atchison, Topeka and Santa Fe Railroad; formerly Director General of Railroads; recently arbitrator under Peace Treaties of questions relating to river shipping and investigator under League of Nations respecting navigation on Rhine and Danube.

LONSDALE, JOHN G.: Banker, of St. Louis, Missouri; president, the National Bank of Commerce, St. Louis; director, St. Louis Reserve Bank; member, Commerce and Marine Committee of the American Bankers Association; director representing Finance Department, Chamber of Commerce of the United States.

MEAD, DANIEL W.: Engineer, of Madison, Wisconsin; professor of hydraulic and sanitary engineering, University of Wisconsin and consulting engineer in these fields; member of the former Red Cross Commission to China on flood protection and formerly consulting engineer, Miami Conservancy District.

PARKER, JOHN M.: Cotton planter and cotton merchant, of New Orleans; former Governor of Louisiana; formerly president, New Orleans Board of Trade, Mississippi Valley Association, etc.

PERCY, LEROY: Lawyer and cotton planter, of Greenville, Mississippi; former Senator of the United States; director, St. Louis Federal Reserve Bank.

SLOAN, MATTHEW S.: Engineer, of Brooklyn, New York; president, Brooklyn Edison Company; member, American Institute of Electrical Engineers; director, Brooklyn Chamber of Commerce; director representing Natural Resources Department, Chamber of Commerce of the United States.

STONE, ALFRED H.: Cotton planter, of Dunleith, Mississippi; vice-president, Staple Cotton Cooperative Association.

The Honorable Herbert Hoover, Secretary of Commerce, whom the President had placed at the head of the government's field activities, had organized efforts in this direction. He was receiving a large measure of assistance from the banks and other financial interests of the country, working directly with him or independently through organizations which they had initiated. The work of rehabilitation received further impetus through the Flood Credits Corporation,—the organization of which was brought about through the efforts of the National Chamber.

FLOOD CONTROL

Measures of immediate relief having been put into effect, and the lines of economic rehabilitation established when your committee was created, the sole remaining problem which has commanded our attention has been that of arriving at "a program which will insure, so far as is humanly possible, a permanent solution" of floods of the Mississippi River.

Almost fifty years ago the federal government became actively engaged in Mississippi River work through the creation of the Mississippi River Commission. The repetition of floods since that time has impressed more and more strongly upon business interests of the country and the general public the national character of this flood control. This statement is supported by the following quotations from "Bradstreets" published April 17, 1897, exactly thirty years previous to the recent flood: "The attention which the subject of Mississippi River overflow is receiving at present is certainly not out of proportion to the vast interests, both human and financial, which are involved, and it seems encouraging to note the practical agreement that whatever is to be done, whether in the strengthening of the present levees or the devising of new and more efficacious plans of controlling the river, should be under national direction."

The committee has been impressed with the insistant demand throughout the nation that the recent flood should not go the way of other floods and be merely recorded in history as "the record flood of 1927," but that it should be remembered as the flood which aroused the nation to its sense of responsibility and directed the forces which will ultimately prevent a repetition. Our present wealth, our increasing national solidarity, the interdependence of various sections of the country, the increasing importance of our great arteries of commerce—our rivers, railroads, and highways; our ability to construct great public works with the highest engineering skill, and our quickened national consciousness, —all call for the removal of this flood menace.

The history of the last twenty-five years has illustrated the fact that we, as a nation, have come only slowly to grasp the magnitude of this flood menace. Rather tardily, it must be admitted, have we come to see that it is something beyond the capacity of the states immediately affected, and the concern of the nation as a whole. As recently as 1917, the federal Congress appropriated forty-five million dollars, which was expected, with the addition of approximately equal expenditures by the local interests, to complete the system adequately. However, only six years thereafter, a further sum of sixty million was appropriated in the expectation of completing this big undertaking. Now we learn that the floods of 1922 and 1927 largely wiped out the expenditures to date, and today we are face to face with the fact that we have either spent too little or too much—too little if we are to do this work effectively, too much if we are doing any less.

In attempting to answer the question of why past efforts to control floods have failed, your committee has made a study of flood control efforts on the Mississippi River, going back through two centuries of levee construction to the time when New Orleans, just founded, took measures through levees to protect itself from the Mississippi. It has reviewed the studies of others in dealing with flood control measures on streams in foreign countries and compared these measures with the policy adopted on the Mississippi. It has considered the Mississippi watershed as a whole, taking into account its climatic and rainfall characteristics, analyzed these according to basins and weighed the flood conditions of the main tributary streams, and their probability of synchronizing so as to create even

greater floods in the main stream. It has reviewed such river phenomena as are particularly applicable to the great delta region.

Besides the physical data and engineering work which have a bearing upon the lower Mississippi River, the committee has caused a complete study to be made of legislative, financial, and administrative measures which are important factors in this flood control problem.

As a means of getting an understanding of the physical, financial, commercial, and economic questions involved, the committee visited the flooded area. Meetings were held at which local districts presented their problems, numerous engineers—federal, state and local—were interviewed and in some instances accompanied the committee on its visits to crevasses and the chief points of interest in the devastated regions. Senators, congressmen, governors, state legislators, and men prominent in industry,—all contributed to the fund of information which the committee obtained. Much material and various plans for controlling floods were received and have been considered.

Although the direct mission of the committee was to deal with facts affecting flood control, mention must be made of other facts of national interest evident throughout the trip; the extent of human suffering, the wonderful heroism and self-sacrifice exhibited, the undaunted courage of the people in facing the future in spite of the physical and financial disasters. The flood was a great object lesson proving the innate generosity of the people. It was an object lesson of the stability of our social structure. The orderly conduct of the colored race, who were by far the greater number affected, was particularly commendable.

FLOOD CONDITIONS

The committee would be glad if it could give an adequate picture of the force and extent of the flood, but to do so is not possible. Nothing short of actual experience with the waters themselves could give this. The committee traveled for days through regions where every house bore at a height of from two to ten feet the brown line, indicating the height of the water. Where the flood was at its worst, houses were destroyed, or carried miles from their foundations. The committee saw millions of acres of rich alluvial soil covered with a mass of cockle burrs, man-high, where before there had been profitable crops. The total estimated area flooded is equal to the combined area of the states of Massachusetts, Connecticut, Rhode Island, Delaware and Maryland. The quantity of water which poured through this valley was the equivalent of ten streams the size of Niagara flowing for a period of four weeks. The statement was made in one of the addresses that at one point in Louisiana it would have been possible to cruise in a motor boat for two days out of sight of land.

What the committee saw was striking evidence of the fact that the Mississippi River drains 42 per cent of the entire area of the United States,—an area in which occurs some of the heaviest rainfall,—rainfall that over extensive areas sometimes equals two feet in less than two weeks.

The work of rehabilitation has gone on rapidly. Roads have been made passable, bridges have been replaced with temporary structures, and to some degree some kind of a crop has been produced over much of the land that was flooded. The committee saw places where there had been three, four, or five floods during the year; but notwithstanding this the people desired to remain on the soil and "come back" as agriculturists. They have confidence in the future of this region.

Determination of the practicability of flood control received the committee's fullest consideration; for on such practicability must rest the whole program of flood control.

FLOOD ELEMENTS

The committee considered the periods of flood occurrence, their extent, the factors that cause floods, probable maximum floods that must be provided for, and river characteristics. Tables, charts and tabulations dealing with these subjects are presented in the appendices.

The oft repeated statement that the effect of the levee system has been to raise the bed of the river itself has been carefully checked and found to be unsupported by the evidence for on this point, the committee is assured by those who have been making observations and studies over a long period of years that such is not the case.

NECESSITY FOR CONTROL

Types of flood control, such as levees, spillways, by-passes, outlets, and combinations of these different methods, have been considered, together with other plans for control, including reservoirs and reforestation on the headwaters of tributaries.

The committee has not attempted to develop a plan of its own, but has directed its attention to determining whether it is practicable to control floods at reasonable cost by a system of levees, spillways, outlets, etc. After listening to many of these proposals and securing the judgment of the highest engineering talent in the country, both governmental and civilian,—federal, state and local,—the committee is impressed with the unanimity of opinion that adequate control of the Mississippi River is practicable.

RESERVOIRS, ETC.

The extent to which reservoirs, reforestation, etc., on the tributaries and headwaters would assist in the control of floods in the lower Mississippi is a controverted question. The committee, after considering this, came to the conclusion that, even if such measures should prove helpful, not only would their accomplishment require many years, but they should be considered as supplemental aids contributing an additional factor of safety in the future control of floods.

In seeking the reason for failure to control floods thus far, the committee has traced the history of development of government policy, both local, state and federal, in the construction of levees along the Mississippi River. It has traced this development from private levees erected at individual expense of the plantation owners to the formation of levee districts, and finally to coöperative building by the federal government and local levee districts.

When levee construction began at New Orleans, in 1717, small earthern dikes of from four to six feet in height were all that were necessary to afford protection from floods. With the general development of the country and the action of other regions to protect themselves from floods, the vast areas which previously had afforded storage for the river were removed, and the history of the river shows a constantly increasing height of river flood crest. During this period the nation has progressed from a sparsely settled territory to one thickly populated with prosperous cities, covered with a web of railroads, public highways, and telegraph, telephone, and power lines. The day has passed when the river can be permitted to overflow its banks, disrupt the commerce of the nation, and bring vast human suffering and economic loss to the flooded area. The immediate loss to the areas affected is not a determining factor; for, while an important factor, it is only part of the general derangement to the commercial life of the nation,—directly by the interruption of commerce, and indirectly by the economic loss which falls on every citizen.

Unfortunately this demand for flood control, calling for higher levees and for other methods of flood control in the interest, not alone of the affected areas, but of the nation as a whole, has outstripped the ability of the flooded areas to pay. The history of the levee districts shows that in some instances districts have taxed themselves beyond their ability to pay. While some regions are better able to pay than others, a proper system of flood control is exactly like a chain, no stronger than its weakest link. Of the twenty-nine levee districts stretching from Cairo to the Gulf, many have reached their full legal tax limit. Many not only cannot pay further sums for the greatly increased expense required, but cannot pay their existing obligations save at great sacrifice.

Thus far the total expenditures since 1882 of all agencies in the construction of levees amount to $225,000,000; whereas the federal government has expended directly for

similar work $65,000,000. The local agencies have expended nearly three dollars to every dollar spent by the federal government.

The investigations of the committee revealed the following reasons why the federal government should bear the entire cost of construction. The problem of flood control is national, particularly because it involves directly or indirectly the flow of commerce, north and south and east and west, in the very heart of the nation. The federal government is authorized under the provisions of the federal constitution to deal adequately with a problem so vital to commerce. Moreover, national defense requires the federal government to see that the nation may not be subject to the derangement of transportation and of the general destructive effects of floods upon the nation in time of war. One speaker asked the question, "What would have been the effect upon the efforts of the United States if the flood had come at the height of our activities in the World War?" and he asked further, "What would be the effect upon the nation if such a flood should happen when we were in a desperate struggle with foreign invaders?" During the recent flood, operation was suspended from 10 to 120 days on 3000 miles of railroad.

The principle that the federal government carries a responsibility for control of floods of the lower Mississippi was recognized in the Mississippi River Commission Act of 1879, which set up that commission and provided funds for work on the Mississippi River. The condition of expecting the local districts to carry the major part of flood control work persisted, however, and the amounts spent by the federal government between 1879 and 1917 for flood control are as follows: federal government, approximately $23,000,000; local levee districts approximately $143,000,000. In 1917, however, the federal government took a long step toward accepting full responsibility for controlling floods and assumed two-thirds of the construction costs of control works, the other one-third of construction costs and rights of way and maintenance being left to local districts. Under the Flood Control Act of 1917, and the further legislation of 1923, the federal government has appropriated in the last ten years over $86,000,000 for flood control works whereas local levee boards have spent about $17,000,000.

SOLE FEDERAL RESPONSIBILITY

The history of the relationship between the federal government and the local districts indicates clearly a growing appreciation of the need of sole federal responsibility. Levee districts and bordering states should not be called on to pay all or part of works that are clearly a national responsibility. Such a principle is seldom applied to harbor works, locks, or dams, or in many instances to highways, which are constructed under the commerce clause of the constitution. It is just as fallacious to attempt to protect the heart of our country from floods by placing the duties both financial and protective upon the bordering districts as it would be to place the protection of our national boundary upon the boundary and coast states, or to call upon the ports of our nation to stand the expense of their navigation improvements.

The committee found that the present arrangement, which calls for local contributions and maintenance, results in a divided responsibility, and is destructive of success in planning, constructing, and maintaining the works necessary for flood control. The federal government in assuming its responsibility for the development of adequate flood control works should not have to deal with the local influences which grow out of this contribution system. Finally, in the words of one member of the committee, "It is a condition and not a theory" which confronts the nation in dealing with this flood control problem. Many of the levee districts are unable to do their part in maintaining the system as it exists today, a system which is obviously inadequate. Clearly they cannot furnish greater contributions to the enlarged program of construction which now faces the nation. The entire project cannot be permitted to lag because of the inability of any of the units to contribute.

The committee has had before it proposals that the federal government should enter into agreements with the affected districts looking to contributions in later years. Prec-

edent is against this principle as applied to works of a national character, and we believe it to be unsound.

In view of the universal demand for unified control and undivided responsibility in meeting this national problem for flood control on the Mississippi River, the local and state governments should not be called upon for further contributions, which, in view of the enlarged expenditures required, would be a small proportion of the whole, and would tend to interfere with the proper discharge of the federal government of its obligations to deal effectively with this problem in a national way.

RECOMMENDATIONS

The federal government should hereafter pay the entire cost of constructing and maintaining works necessary to control floods of the lower Mississippi River. (For the purpose of this report, lower Mississippi means from Cairo to the Gulf.)

The federal government should assume the sole responsibility for locating, constructing and maintaining such works.

As a result of its studies the committee is forced to conclude that the reason why the Mississippi River is still uncontrolled is a weak financial plan and inadequate and divided administration, and not inability of the nation's engineers to develop adequate plans. Unfortunately thus far the problem put up to the engineers has not been, "What levee will you build to safeguard the country behind it, and what will it cost?" The engineer has been given a certain sum of money to be expended in a given district and told to make it go as far as possible.

APPROPRIATIONS

That any plan of flood protection which may be adopted may be carried forward in the most economic and efficient manner, the rate at which appropriations may be expected must be definite. The first years of carrying into effect the project finally adopted will naturally call for sums less than in the later years when the organization has been fully perfected. Statements unfortunately have been made that enormous sums of money will be required immediately to deal with this project. Undoubtedly in the aggregate large sums will be required, but expenditures must necessarily be spread over a period of years, and certainly the amounts required for construction during the next year or two will in no way cast a burden upon the Treasury or interfere with the government's fiscal policies.

Inadequate appropriations in the past have materially delayed the carrying out of a systematic plan of protection. They are sufficient reason for insisting upon a proper financial scheme at this time. What the final cost of the project now being designed by the Mississippi River Commission and the Army engineers will be, can be only approximated at this time. The cost of this plan, or some modification, is not an issue. Competent authorities assure us, and we confidently believe, that the expense, though large, is one the nation can well afford to pay. Possible variations in the total figures are unimportant. The job must be done. It must be done as rapidly as the organizations for doing it and the detailed plans for the work can be perfected, after the project itself has once received national approval.

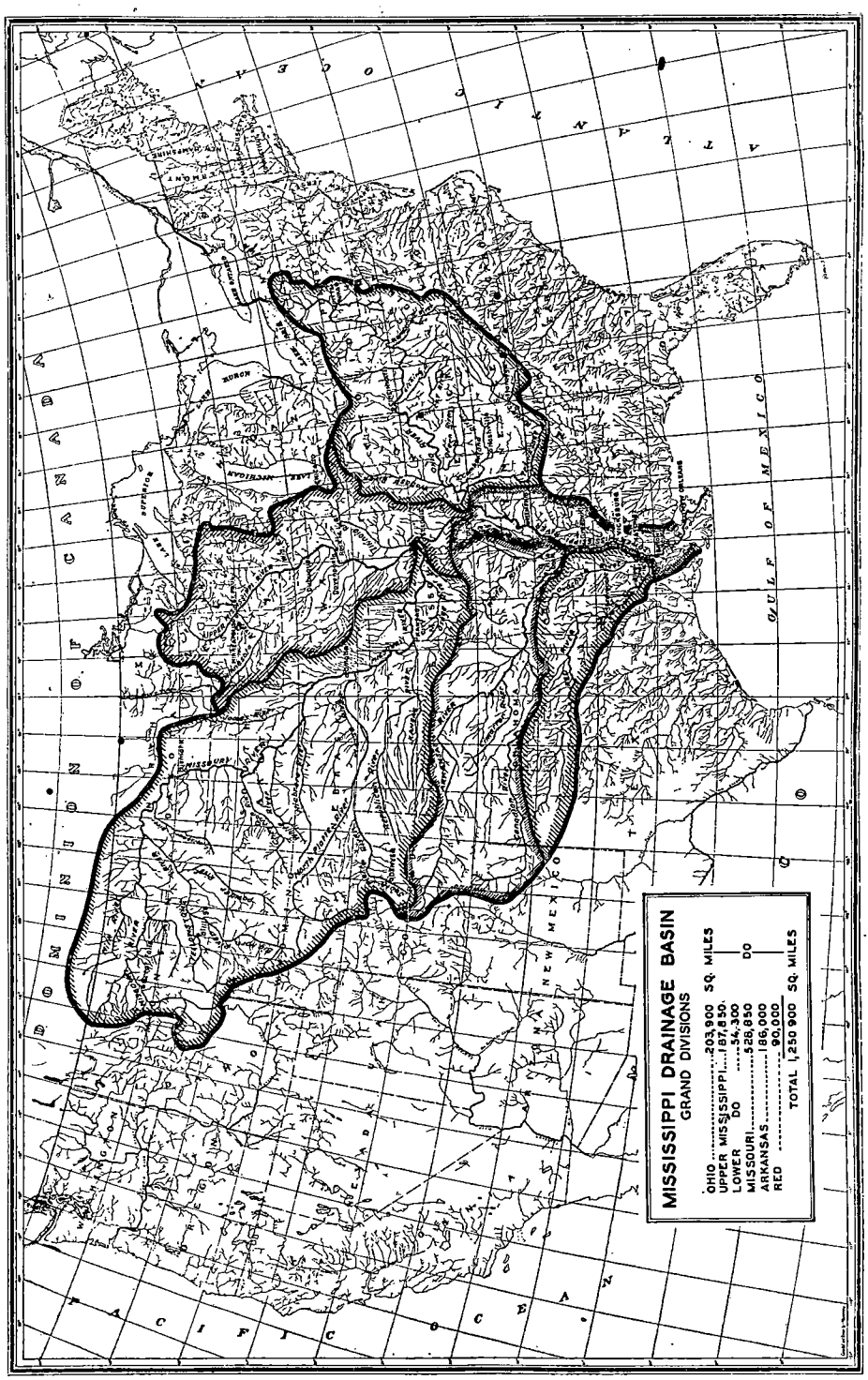
The necessary money must be available as needed. Conditions in the past may have justified the course which the federal government has pursued. On this point no comment need be made. We must accept the past as it is and profit by the experience gained. To permit this periodical destruction to continue, would be not only an indictment of our patriotism and wisdom, but an unescapable indication that we are unwilling to use our present vast national wealth and our administrative and engineering ability to remove this menace from the heart of our country. We, therefore, recommend that, *there should be an adequate appropriation to insure efficient, continuous and economic work, the funds to be made available as needed.*

In attacking this great national problem in which the federal government is to assume sole responsibility for its solution, and is to pay the entire cost of the project, the project

itself must be definitely conceived and set apart from all other domestic problems. It must be singled out and the solution considered and financed free from any relationship with other national or local problems. This is necessary because of the nation's interest in a complete and permanent solution. Such a solution can have nothing less than the support of the whole country. It must have particularly the support and judgment of all business interests. These cannot be divided, nor can they be considered in any way as related to similar developments elsewhere. This nation built the Panama Canal under just such circumstances, and in some respects this project is a more important one than building the Panama Canal. That project was a definite and entirely separate undertaking by the federal government. In such manner should the government attack the problem of flood control in the Mississippi River. It must not be entangled with any local conditions or limitations, financial, physical, or political. Neither should it be tied in with internal developments elsewhere within the country. The control of the Mississippi River floods is now more than ever before our greatest domestic problem. Legislation should deal with it singly, and free from other projects.

The committee had presented to it suggestions for extending flood control to tributaries of the lower Mississippi River and it has considered plans on a much larger basis involving the entire Mississippi River watershed; but it has always been forced to return to the important problem facing the main-trunk system of the lower Mississippi River. So long as the system of flood prevention in the lower region remains incomplete, this region requires first attention. The government is already prosecuting a study of the problems of tributary streams under an appropriation by Congress made for that purpose. The committee therefore makes no recommendation on this subject, pending that investigation.

We have recommended that sole responsibility for constructing the works to control floods be placed upon the federal government and the payment of the entire cost by the federal government in order to fortify this responsibility. It is equally important that the plan of administration should be centralized. As stated before, the project is likely to be more extensive than the Panama Canal and we may well take a leaf from the nation's experience with that great project. There should be a carefully formed organization adapted to carry on and complete a project of such proportions, vested with ample power for the necessary research by way of preparation for the adoption of its plans, and for carrying out the work, and with full discretion in all matters of engineering, operation and maintenance. We, therefore, recommend that, *flood control of the Mississippi River is a work of such magnitude and urgency that it should be dealt with in legislation and administration upon its own merits, separate and distinct from any other undertaking.*


MISSISSIPPI DRAINAGE BASIN
GRAND DIVISIONS
OHIO ..... 203,900 SQ. MILES
UPPER MISSISSIPPI 187,850
LOWER DO ..... 54,300 DO
MISSOURI 528,850
ARKANSAS 186,000
RED 90,000
TOTAL 1,250 900 SQ. MILES
GULF OF MEXICO
PACIFIC OCEAN
NEW MEXICO

The Plan[1] for Flood Control of the Mississippi River in Its Alluvial Valley

Presented to the Secretary of War and by Him to Congress

By Major General Edgar Jadwin
Chief of Engineers

I HAVE the honor to submit the following project for the flood control of the Mississippi River in its alluvial valley.

The plan is a comprehensive one, providing for the maximum flood predicted as possible, and for future expansion to meet changing conditions. It includes a spillway above New Orleans, diversion floodways in the Atchafalaya and Tensas Basins, a river bank floodway from Cairo, Illinois, to New Madrid, Missouri, together with strengthening and a moderate raising of existing levees. It is designed to prevent any material increase in flood stages. Channel stabilization and navigation improvement are included. Exclusive of rights of way, incidental drainage works, and damages, if any, recommended to be borne by local authorities, the estimated cost of flood control works is $185,400,000, and of channel stabilization and mapping $111,000,000; a total of $296,400,000. The distribution of cost must be determined by law. The suggestion is made that a distribution by which the cost of flood control works in general is borne 80 per cent by the Federal Government and 20 per cent by the Valley States, and the entire cost of channel stabilization is borne by the United States, would accord with the fiscal policy of the President and the precedents established by Congress.

[1] This is a copy of that part of this report in which the plan is presented.—*The Editor.*

The reorganization of the Mississippi River Commission, Federal control over structures within natural floodways, and the comprehensive mapping of the alluvial valley are also recommended. Flood control of tributaries will be reported upon after the completion of surveys already authorized by Congress.

The control of Mississippi floods by reservoirs is shown to be too costly to warrant their construction. Their development for local benefits is discussed. Other suggested schemes, including levees of sufficient height to contain the maximum possible flood, are discussed, but found inadvisable.

Essential Features

The recommended plan fundamentally differs from the present project in that it limits the amount of flood water carried in the main river to its safe capacity and sends the surplus water through lateral floodways. Its essential features and their functions are:

Floodways from Cairo to New Madrid, from the Arkansas River through the Tensas Basin in the Red River, and from the Red through the Atchafalaya Basin to the Gulf of Mexico. These will relieve the main channel of the water it cannot carry and lower the floods to stages at which the levees can carry them.

A controlled spillway to hold the levels down to safe stages at and near New Orleans.

Local setting back of the levees in the main river at bottle necks to increase its carrying capacity and reduce its flood heights.

Greater protection against crevasses by strengthening the levee by reducing flood heights through the increased widths of channel afforded by floodways, spillways and setbacks, and by moderately raising the levees where needed to meet predicted flood stages.

The progressive revetment of caving banks to protect the foundation of the levees and to stabilize the river both for flood control and navigation.

Improved navigation channels for river traffic, not less than 300 feet wide and 9 feet deep, to be obtained by dredging and draining works where necessary between Cairo and New Orleans.

The estimated construction cost of the complete plan is $296,400,000, and it can be advantageously executed in approximately ten years.

The project recommended gives the maximum of results for the minimum of cost. It recognizes the interests and protects the rights of those who will be chiefly benefited and of the taxpayers who furnish the funds. Complete flood control embodying the cheapest practicable reservoir system would be much more expensive.

The plan heretofore pursued has been the construction of levees high enough and strong enough to confine all of the flood waters within the river channels. The levees that have been constructed are not sufficiently high for such floods as are now predicted. The cost of raising and strengthening them sufficiently to carry extreme floods would greatly exceed the cost of the plan proposed. Furthermore, the extent of the disaster which follows a crevasse increases greatly as the flood is forced to higher stages by confinement wholly within the levee system. The loss of life and property in the recent great flood in the alluvial valley followed the breaking of the levees which reclaimed the land for the use of man. This reclamation had been pushed so far that insufficient room was left in the river for the passage of the unprecedented volume of flood water. The levees must be strengthened, but a halt must be called on further material increase in their heights and the consequent threat to the inhabitants of the areas they are built to protect.

Man must not try to restrict the Mississippi River too much in extreme floods. The river will break any plan which does this. It must have the room it needs, and to accord with its nature must have the extra room laterally. In its original state the river had only one low water channel until it reached the flat land near the Gulf, but in flood it overflowed an area 50 miles wide, which is really its natural flood bed. The water which cannot be carried in the main channel with the levee at reasonable height must be diverted and carried laterally. Some additional capacity can be obtained in the main river by local setbacks of the levees. As a general setback is not practicable the remainder must be supplied by floodways paralleling the general course of the river.

The plan recommended provides the requisite space for the passage of floods, and levees of adequate strength to withstand them, so that should a flood recur of the magnitude of the flood just experienced, the maximum of record, it would be passed out to the Gulf without danger to life in the alluvial valley, and without damage to property except in the floodways allotted for its passage. Controlling side levees limit the area of the floodways, and protect

land not in the floodways where such protection justifies its cost.

Should Divine Providence ever send a flood of the maximum predicted by meteorological and flood experts as a remote probability, but not beyond the bounds of ultimate possibility, the floodways provided in the plan are still normally adequate for its passage without having its predicted heights exceed those of the strengthened levees. The plan is designed to be both simple and comprehensive, flexible and adequate to prevent a calamity such as that of 1927 from happening again as the result of any flood past or predicted. It is capable of modification or expansion, if desirable, to further accommodate an increasing population and its property.

FLOOD CONTROL OF TRIBUTARIES

Plans for the flood control of the tributaries will be developed as funds become available in accordance with an act passed at the last session of Congress. It is impracticable to present such plans at this time, because of lack of data and time. Congress recognized the need for further data when at its last session it enacted a law in the River and Harbor Act, approved January 21, 1927, authorizing and directing surveys by the Corps of Engineers of a large number of rivers, including the tributaries of the Mississippi, to determine the best use of their water resources. Flood control, power, irrigation, drainage, navigation and water supply must all be considered. This act was designed to promote the harmonious and coördinate development of all our water resources. Work on these surveys will require several years and will be expedited as funds are made available in future appropriation bills. Much work which has been done in arriving at the present alluvial valley project, particularly that done in the study of reservoirs, will be of value when the tributary studies are undertaken. Many reservoirs on the tributaries which would be of little help to the Mississippi will be of great value in the control of floods on the tributaries as well as for other uses.

For the above reasons, only the lower courses of such tributaries as are directly connected with the flood control of the Mississippi in the alluvial valley are included in the plan herein. The other parts of the tributaries will be reported on as soon as practicable as contemplated by the Act of Congress referred to above.

DESCRIPTION OF PLAN FOR FLOOD CONTROL OF ALLUVIAL VALLEY

The details of the plan by which the surplus water will be carried with safety vary in different parts of the river. The alluvial valley of the river may be considered in three principal sections; the northern, comprising the St. Francis Basin on the west side of the river; the middle, including the Yazoo Basin on the east, and the Tensas Basin on the west, running on the east from near Memphis to Vicksburg and on the west from the Arkansas River to the Red River; and the southern, or Louisiana Section, from the Red River to the Gulf of Mexico.

The portion of the alluvial valley from Cape Girardeau, the northern limit of the alluvial valley, to Cairo, can be protected by a slight increase in the size of the levees. The serious problem begins at Cairo at the confluence of the Ohio and the Mississippi. From here to New Madrid the main levee on the west bank chokes the river unduly and should be set back sufficiently to lower the head of water at Cairo by 6 feet in an extreme flood. The existing river bank levee will be retained, but lowered 5 feet. The floodway between the new and the old

levees will be capable of cultivation at all times excepting in floods greater than that of 1922.

An estimate is included for removing part of the dike on the Tiptonville Ridge to reduce the backwater area at the mouth of St. Johns Bayou to the minimum practicable.

From New Madrid south to the mouth of the Arkansas, the levees will be raised moderately. Local setbacks will be made below Helena and at other bottlenecks where necessary to restore greater cross sections in the main river. These modified works are designed to carry the highest predicted flood, except that it may be found expedient not to raise the levees opposite the backwater areas of the St. Francis and White Rivers. In this event, if a possible superflood should come, it may cause a crevasse in the levees at these points, increasing somewhat the height and acreage of backwater area, but doing comparatively little harm.

From the mouth of the Arkansas to the Old River, at the mouth of the Red, extreme floods cannot be carried between levees of the Mississippi without dangerous increase in their heights. A floodway for excess floods is provided down the Boeuf River, on the west side of the river. Excess water cannot be carried through the section on the east side, since it would be forced back into the main river by the high lands on the east bank below Vicksburg and have to be carried thence for 160 miles between the main river levees to the mouth of the Red River. The entrance to the floodway is closed by a safety plug section of the levee, at present grade, which is located at Cypress Creek, near the mouth of the Arkansas. To ensure their safety until this section opens, the levees of the Mississippi, from the Arkansas to the Red, will be raised about 3 feet. To prevent flood waters from entering the Tensas Basin, except into the floodway during high floods, the levees on the south side of the Arkansas will be strengthened and raised about 3 feet as far upstream as necessary.

The section at the head of the floodway will protect the land within the floodway levees against any flood up to one of the magnitude of the 1922 flood. A flood of a magnitude somewhere between that of 1922 and of 1927 will break it, turning the excess water down the floodway, which will carry it safely to the backwater area at the mouth of the Red River.

Below the Red River, setbacks of the levees will be made at critical places in the main river, to insure the better discharge of flood waters, but the carrying capacity of the main river cannot be increased materially without unwarranted hazard to life and property in the state of Louisiana. At the city of New Orleans, an increase in levee height is considered unsafe, aside from the great cost of raising the levees and the wharves built upon them. To afford proper protection to New Orleans, with its population of nearly half a million and property value of over a billion dollars, a special floodway upstream from the city is essential. The most practicable location is on the east side of the river, discharging into Lake Pontchartrain. A controlled spillway at Bonnet Carré will limit the discharge through this floodway to that necessary for the protection of the city.

At high floods it is also necessary to divert down the Atchafalaya Basin the flood waters in excess of the discharge capacity between the levees of the Mississippi. This is accomplished by strengthening and raising the levees on the main river 3 feet for the necessary distance to assure their safety until levees at the head of the Atchafalaya

Basin open. The levees on the south bank of the Red River will be strengthened and raised sufficiently to keep flood waters from entering the Atchafalaya Basin except in the floodway, through the relief or fuse plug levees at the head of the floodway. Back levees are to be constructed on both sides of the Atchafalaya Basin for the major part of its length, to enclose the Atchafalaya floodway. Funds are included in the estimate for the extension of these levees to the south, to limit the overflow in the lower part of the Basin.

Existing levees on the Atchafalaya River will be strengthened and their grade adjusted so that the productive capacity of such parts of the floodway as are not already swamp land will be retained during any flood of record of a less magnitude than that of 1927.

The plan includes an extension of revetment of the banks of the river, to reduce the danger of attacks on the foundations of levees and their destruction by caving banks, thereby to further reduce the possibility of crevasses and to stabilize the position of the river in order that contraction or regulation works may be provided, to assist in securing and holding the low water channels needed for carrying the commerce of the valley in low water as well as in high.

The area in the alluvial valley that would be flooded by Mississippi River water if there were no protecting works is approximately 30,000 square miles. Under the plan recommended, barring accident, approximately 20,550 square miles will be protected annually. The remaining 9450 square miles, of which approximately 3340 square miles is cleared land, will be protected on an average of from 2 years in 3 to 14 years in 15, depending upon its location. The remaining 6110 square miles are swamp and timber land which is not injured by flood.

The estimated cost of $296,400,000 for the construction of flood control and navigation work does not include the costs of rights of way nor possible damage to structures which have invaded the natural flood bed of the river. It is expected that these, if any of them are legal and proper, will be borne by the states or other local interests who will in general be greatly benefited by the execution of the plan.

ECONOMIC NECESSITY AND LOCAL COÖPERATION

As directed by the law relating to reports by the Department, I submit a statement as to the general and local benefits of the plan and the local coöperation that should be required on account of local benefits. The question must be viewed from the standpoint not only of those in the valley needing flood protection, but also of the taxpayers in other parts of the country, including the regions from which the flood waters come, who suffer indirectly from flood disasters, and on whom the bulk of the burden of Federal expenditure must fall.

Several estimates of different well-protected parts of the delta valley result in an average price per acre of $224 when towns and all property, such as houses, roads, railroads, land, etc., are included. The total area of the valley originally subject to overflow is 29,790 square miles, or 19,065,600 acres, 12,000,000 acres of which is usable. This 12,000,000 acres at $224 per acre is worth about $2,688,000,000. Adding the probable value of New Orleans would bring this sum up to about $3,500,000,000. Movable property added would make it something like $5,000,000,000.

The value and population behind the levees are increasing all the time. It has been estimated that damages from the 1927 flood were over $200,000,000.

The plan for river control contemplates spending about $3,000,000,000, or about one-sixteenth of the value estimated above. On the basis of 12,000,000 acres of usable land, this is an average expenditure of about $25 per acre, but it must be remembered that this includes protection to cities, towns, etc.

The cost of the project is unquestionably justified. It will prevent a repetition of the widespread disaster, human suffering, dislocation of the economic life of the valley, interruption of interstate commerce, and the effect on the general welfare of the nation, that attended the recent flood. The expenditure would be justified even though such a flood occurs but once in 150 years. It will prevent the less extensive flood disasters that are likely to occur at much more frequent intervals. The protection afforded to the cities back of the levees in the valley against a flood even greatly exceeding that just past is especially justifiable from a humanitarian standpoint, since an unexpected break in the levees at these places would probably result in serious loss of life and might be an unparallelled catastrophe.

The estimated cost of $296,400,000 for the construction of flood control and navigation works does not include the costs of rights of way for flood control works, the cost of any drainage works required therewith nor the cost of any flowage rights that may be required, nor damages, if any, resulting from the execution of the plan. No questions of rights of way or damages arise in connection with the navigation works. Local interests should in the future as in the past provide all rights of way for flood control structures. They best can obtain the land at a fair value, and vexing questions as to Federal ownership, administration or police of the narrow strips of land will be eliminated. Their land is enhanced in value by the works. Tax collections show that the land in the Upper Yazoo Basin has ten times the value that it had before it was leveed. The United States ought not to buy a part of the land to enhance the value of the rest.

Such drainage works as will be required in connection with new interior levee construction are of direct benefit to the lands affected and their cost should be borne locally.

It is a fundamental principle that no damages lie against either Federal or State Government, or local agencies, on account of an accidental crevasse in the levees. The plan has been drawn to reduce to a minimum the damage to lands and structures resulting from the flow at high floods through the floodways. All property affected lies in the natural high-water bed of the river. Much of this land was transferred to the states by the Swamp Act approved September 28, 1850. The purpose of this Act was to enable the states to construct the necessary levees and drains to reclaim the swamp and overflowed lands therein. The principle involved was not new, as the early French grants in the lower valley contained a proviso requiring the grantee to construct and maintain a levee line along the river front of his property. In the state of Louisiana, this old servitude has been transferred by the state to the levee district in which the land is located. Whether or not the servitude of flooding was transferred to private owners when the land was sold, the servitude existed when the land was granted to the states without cost. It should not now be paid for by the Federal Government. Moreover, the lands, with some exceptions, will have the same protection as is afforded by the present levee system, a protection provided partly at the expense of the Federal Government.

The exceptions are the lands in the Bonnet Carré floodway and in the setback floodway from Bird's Point to New Madrid. The acquisition of flowage rights by the state or local interests may be necessary in these cases. In any case, the lands should remain in private ownership in order that their productive capacity may be fully availed of. The United States does not in general own the bed of navigable streams; much less need it own land flooded only at long intervals. Damages, if any, which may be found legal and proper as a consequence of the plan should be met by the states, since these will be directly benefited by the works.

The project should be authorized subject to the condition that, except when specially authorized by the Secretary of War, upon the recommendation of the Chief of Engineers, no Federal funds shall be expended upon the part of the project within any state until that state has accepted by appropriate legislation these conditions and responsibilities. The saving exception is suggested to cover the case where the procedure requisite to the enactment of the legislation would unduly delay the initiation of work of far-reaching benefit, particularly if such work is essential to the protection of another state which has fulfilled these conditions.

The present Flood Central Act provides that local interests shall pay one-third the cost of levee construction. The following table shows the proportions of the cost of levees actually borne in the past by the Federal Government and local authorities:

AMOUNTS EXPENDED BY THE UNITED STATES GOVERNMENT IN THE CONSTRUCTION OF LEVEES AND THE AMOUNTS EXPENDED BY STATES, LEVEE DISTRICTS, AND COMMUNITIES INTERESTED, FROM 1882 TO DECEMBER 31, 1926, COVERING COST OF YARDAGE PLACED, RIGHTS OF WAY, INTEREST, ENGINEERING EXPENSES, REPAIR WORK, HIGH-WATER EXPENSES, CREVASSE CLOSING, ETC.

M. R. C. Districts	Expended by United States from Government Funds	Expended by United States from Contributed Funds	Expended by State and Local Organizations	Total
Northern	$3,127,533.49	$1,083,857.69	$9,916,110.91	$14,127,502.09
First and Second	19,796,161.78	4,348,420.82	42,766,497.05	66,911,079.65
Third	27,614,208.84	5,852,103.37	34,782,460.96	68,248,773.17
Fourth	20,552,089.47	3,773,898.32	64,488,106.33	88,814,094.12
Total	$71,089,993.58 30%	$15,058,280.20 7%	$151,953,175.25 63%	$238,101,449.03

In addition to meeting the costs shown in the table, the inhabitants of the valley have been subject to recurring flood damage. The direct damages suffered from the 1927 flood are estimated by the Mississippi Flood Control Association to have been $236,334,414.06.

The table clearly shows that the people of the valley have borne much the greater part of the cost of flood protection, although the United States has given substantial aid. The local participation has furthered the keen interest of each locality in the proper

execution of the work. It has afforded a check on pressure for the execution of works not economically justified.

The division of cost has led to some division of control. The enlargement of levees affecting large areas has been delayed, in some cases, by the failure of a levee district to furnish its share of the cost. It is doubtful whether these disadvantages have counterbalanced the advantage of a local proprietary interest in the works.

The comprehensive plan now presented does not include the protection of areas whose reclamation is not economically justified, but contemplates that such areas be left open for temporary storage and the discharge of floods. If no local contribution is required, the law and the administration of this project must be relied on to prevent the construction of works not economically justified. If a contribution, small in comparison with the cost of work already done and to be done, will assist materially in retaining the proprietary interest and watchfulness of local authorities, it would seem to be justified.

In view of the national aspect of the flood control problem from the standpoint both of the cause and of the effects of the floods, and in view of the large sums spent in the past by the people of the valley for flood protection, the sacrifices they have made in meeting their allotments, the great losses suffered in the past flood, and the larger expenditures now required, it is believed that the United States should bear a larger proportion of the cost of construction than in the past, and that of the states or local interests be as small as consistent with the results desired. While the proportion must be determined in the wisdom of the President and Congress, a division by which the United States bear 80 per cent and local interests 20 per cent of the cost of levee construction and control works in general; and by which the United States bear 50 per cent and local interests 50 per cent of the cost of the special ring levees proposed at Morgan City, Melville, Simmesport and Arkansas City, would be in general accord with the existing policy of the President and the precedents established by Congress.

The expenditure for flood control structures proper, required in the comprehensive plan herein recommended, exclusive of navigation works, revetments, etc., is $185,400,000.

On the basis suggested, the total construction costs would be divided as follows:

BY THE UNITED STATES	
80% of general levee and control works	$147,360,000
50% of special protection work	600,000
100% of works for channel stabilization and mapping navigation	111,000,000
Total	$258,960,000
BY LOCAL INTERESTS	
20% of general levee and control works	$36,840,000
50% of special protection works	600,000
Total	$37,440,000

The local interests are also expected, under the project, to furnish rights of way, and protect the United States against charges for flowage easements and damages.

While $37,440,000 is small in comparison with the amount to be spent by the United States and with the amounts already spent by the people of the valley, it must be remembered that those people still owe considerable sums on their bonds on which the money spent was raised. Some of the levee districts are also near the limit of their bonding power under present state law and also near the limit of their credit. However, it is not equally clear that

this expenditure, spread over a ten-year period among four or more states, would constitute an unreasonable burden, on the states themselves, in view of the increased taxable values which will result from the improvement.

SUMMARY OF PROJECT

I recommend the adoption and authorization of a comprehensive project for the flood control of the Mississippi River in its alluvial valley and its improvement from the Head of the Passes to the Ohio River as set forth in this document, to be prosecuted under the direction of the Secretary of War and the supervision of the Chief of Engineers; the project to include the floodways, spillways, levees, channel stabilization, mapping, etc., hereinbefore recommended, with such modifications thereof as in the discretion of the Secretary of War and Chief of Engineers may be advisable, and the maintenance of a navigation channel from Cairo to New Orleans not less than 300 feet in width and 9 feet in depth, all at an estimated initial cost of $296,400,000 with $6,000,000 annually for maintenance after completion of project, with such distribution of costs as may be specified by law after considering the statements on economic necessity and local cooperation in paragraphs 25 to 42 inclusive. Its adoption should be made subject to the provision that, except when authorized by the Secretary of War upon the recommendation of the Chief of Engineers, no funds appropriated by Congress for the execution of the project shall be expended on works within a state until that state by appropriate legislation

(a) Has undertaken to provide without cost to the United States and when required the rights of way for all levee structures, and such drainage works as may be made necessary by new levee construction.

(b) Has consented to the maintenance of the levee at the head of floodways within the state at the grades and cross sections necessary in the opinion of the Chief of Engineers for the security of the levee system and the lands protected thereby.

(c) Has agreed to hold and save the United States free from all damage claims resulting from the construction of the project; and to maintain all flood control works after their completion, except controlling and regulating spillway structures.

I recommend that the Secretary of War be authorized to continue in his discretion, and under the supervision of the Chief of Engineers, the prosecution of such works for the flood control of the Mississippi River as have heretofore been authorized and are not included in the project herein recommended; to expend, in an emergency, funds appropriated for the execution of the project on the maintenance of any levee, when it is demonstrated to his satisfaction that the levee cannot be adequately maintained by local interests; and to secure the assistance, whenever practicable, of the United States Geological Survey, the Coast and Geodetic Survey or other mapping agencies of the Government in the preparation of maps required in furtherance of the project, and to allot funds therefor to them from funds appropriated for flood control work.

I further recommend that legislation be enacted:

(a) Prohibiting any obstruction not affirmatively authorized by Congress to the flood discharge capacity of the alluvial valley of the Mississippi River below Cape Girardeau, and providing that it shall not be lawful to build or commence the building of any levee or other structure in said alluvial valley, or in any

floodway provided therein unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War.

(b) Providing that the penalties and procedure applicable to violations of the laws for the protection and preservation of the navigable waters of the United States, enacted in Sections 12 and 17 of the River and Harbor Act of March 3, 1899, shall apply to violations of the above provision of law.

(c) Providing that existing laws relating to the acquisition of lands, easements on rights of way needed for a work of river and harbor improvement shall be applicable to the acquisition of lands, easements or rights of way for flood control works.

(d) Amending Sections 3 and 4 of the Act of June 28, 1879, constituting the Mississippi River Commission; to provide that it shall be the duty of said Commission to advise on all questions relating to the improvement of navigation on the Missisippi River and the prevention of destructive floods which may be referred to the Commission by the President of the Commission or higher authority, and to provide that the President of the Mississippi River Commission shall have the qualifications now prescribed by law for the Assistant Chief of Engineers, and shall receive the rank, pay and allowances of a Brigadier General of Engineers while actually assigned to such duty by competent orders.

What Forests Can Do for the Mississippi River

By E. A. SHERMAN
Associate Forester, U. S. Forest Service

IN 1879 the Government of the United States recognized that the control of the periodic floods of the Mississippi River was a national problem. To meet this problem Congress created the Mississippi River Commission, consisting of seven members, three of whom are selected from the Corps of Engineers, United States Army, one from the Coast and Geodetic Survey, and three from civil life. This Commission operates under the direction of the Secretary of War and the Chief of Engineers. Its integrity and devotion to duty have never been questioned.

This Commission after a careful study developed a plan for controlling the floods by means of a system of levees and, with the approval of Congress, work thereon started in 1882. Up to June 30, 1926, there had been expended in the furtherance of this plan a total of $174,469,931.06 on the Mississippi River, $81,686,285.56, including $16,689,146.66 contributed by local interests, being for flood control.

In his report for the year ending June 30, 1926, the Chief of Engineers, United States Army (page 1793), said:

> *Effect of Improvement.*—It may be stated in a general way the improvement is providing a safe and adequate channel for navigation and is now in condition to prevent the destructive effect of floods.

Then came the flood of 1927, the greatest physical disaster in American history. Of the 30,000 square miles threatened with inundation, the levees successfully protected 12,000 square miles having a larger percentage of cultivated land than the 18,000 square miles flooded. Nevertheless the resulting loss of property was great and fell upon a people already heavily debt-burdened for the construction of costly flood defense works. Loss of human life was providentially small, but the suffering, misery, and despair was such as is only known by a people who have to flee their homes before the advancing hosts of an invading army. In this case the invading army was water instead of armed men. The element of personal conflict was absent but in its stead was an impersonal relentless element that covered all things, penetrated everywhere, and when it withdrew left behind only death, filth, ruin and decay.

These facts are recited, not with the thought of charging delinquency to the Commission. Omnipotence cannot be expected of any human agency. Rather are they recalled as proof that the problem is one of controlling great natural forces and that no system of protection that man erects can have factors of safety so great that assistance from other sources should be ignored. Doubtless the Commission itself would be the first to subscribe to such a conclusion. Probably there is nowhere in the country today any considerable sentiment for "levees only," but even the writer of this article acknowledges a conviction favoring "levees first."

In the past there has probably been a tendency to overstate the case both for and against forests as a factor in flood control. Let it, therefore, be understood at the outset that the writer does not advocate forests as a substi-

tute for levees. Levees are necessary now, always have been necessary, and certainly will be necessary for generations to come. They should be constructed high enough and strong enough to control the greatest flood within the range of reasonable probability. This country is rich enough and resourceful enough to construct a system of levees of that kind, and the writer would not advocate diverting from such a project a single dollar necessary to its successful completion.

The problem of providing immediate protection to the region threatened by flood waters can only be solved by the construction engineer whose field of direct responsibility is the protection of a limited area of about 30,000 square miles, formerly used by the Mississippi River periodically as part of a great flood channel, but now taken over by man for agricultural and other purposes. At the same time there is a great problem of land use which also has a direct bearing on the regimen of the Mississippi. It involves the entire area of about 1,225,000 square miles which contributes its surplus waters to that stream. The use which is made of any part of that vast area directly affects runoff and runoff makes floods.

One of the most common forms of use to which land is put is the growing of forests. Generally speaking, the lands so used are those having the most direct bearing on floods. They are lands too rough and steep for cultivation and the high mountain lands which receive a heavier precipitation than the plains lands. Forests of swamp or bottom type and on level sandy soils which absorb the heaviest rainfall without washing are exceptions to the general rule.

Originally about 60 per cent of the Mississippi basin was treeless and 40 per cent forest. In De Soto's time the river was subject to floods. The Missouri brought down its great loads of silt from the "Badlands" and the Arkansas brought its burden of soil from "The Breaks" at the edge of the "Staked Plains," and each spring the flood waters deposited a layer of silt over the 30,000 square miles which we now wish to permanently reclaim.

Since De Soto's day the proportion of forest land in the valley has been cut to 20 per cent, or about 250,000 square miles. It is idle to expect that the proper use of this relatively small proportion of the entire watershed could prevent floods. Upon the other hand it is equally absurd to say that the use of so great an area has no bearing on resulting floods and runoff. Avoiding extremes in either case, one may expect provisions for the efficient protection and management of the forests now existing on the watershed and the replanting of lands which are now washing badly and should never have been cleared, will be included in future plans for Mississippi flood control, and that such use of land will add materially to the security and permanent usefulness of the supplementary levees and other necessary engineering structures.

For a clear understanding of the influence of forests on streamflow regulation one must take into consideration certain laws of physics governing the power of running water. First, the erosive or abrading power of a stream varies as the square of its velocity. For example, if the velocity of the stream is increased ten times its erosive power is increased one hundred times. Second, the transporting power of water varies as the sixth power of its velocity. For example, if the velocity of a stream is increased ten times, its transporting power is increased one million times. A current two miles an hour will move along its channel fragments of stone the size of a hen's egg, weighing about three ounces, while a

torrent of twenty miles an hour will carry boulders weighing one hundred tons.

It is a self-evident fact that water falling on steep lands tends to rapid runoff. The laws just cited show that erosion is tremendously increased by rapidity of runoff. It follows that for any given type of soil the steepest lands are most subject to erosion. Therefore it is upon steep rough lands that forests as an erosion-preventive factor are most important.

Coincident with retarding erosion and runoff, forests also retain a considerable volume of moisture and increase the amount taken up by the soil. Not only is the earth protected from beating rainfall but the precipitation is broken up by the leaf canopy, and must either settle in the form of mist or reassemble on twigs and branches and slowly trickle to the ground. Also, if the forest has been protected from fire and excessive tramping of stock, the trickling moisture encounters a layer of humus composed of dead leaves and other vegetation which readily absorbs water amounting to several hundred times its weight.

A layer of humus four inches deep will easily retain and transmit to the soil one inch of rainfall. This statement is conservative. The immediate water storage capacity of such a forest may therefore be calculated as equivalent to 3630 cubic feet. The effect of increasing water storage on a single acre would hardly be noticeable on the smallest stream. The effect of even a million acres would scarcely be noticed in the volume of a great Mississippi flood. However, it is just as true of the Mississippi flood as it is of the smallest rivulet that its burden of liquid and solids is made up of little drops of water and little grains of land.

The total area of forest land and lands once forested but now unused and bare of forest growth in the Mississippi drainage basin is 250,000 square miles. About 200,000 square miles of such forests and forest land is far from doing what it might to hold back flood waters and prevent erosion. Some lands are in fairly good shape; some very bad shape. To rate the present water holding capacity of any but the best of these lands at 50 per cent that of a well stocked, well protected forest is generous indeed. If we reforest the bare unused forest lands and protect the remaining forests, both old and young, from fires, and prevent overgrazing, this should on the average increase the layer of humus on 200,000 square miles by two inches. Such an increase means 1815 cubic feet of water storage by each acre of forest land so improved. Applied to 200,000 square miles such improved forest conditions would give an increased water storage capacity totalling 232,320,000,000 cubic feet, or the equivalent of the entire reported average flow of the Mississippi River at Quincy, Illinois, for a period of nearly thirty-seven days.

For the purpose of assisting in the regulation of streamflow on the Mississippi, dams have been constructed at the outlet of Lake Winnebigoshish and five other lakes at the headwaters of that river, thereby creating what is said to be the greatest water impounding system in the world. These six great storage reservoirs have a total impounding capacity of somewhat over ninety-five billion cubic feet. The forests of the valley can be made to store and regulate the flow of about two and a half times the total capacity of these great reservoirs over and above the present water storage service, while at the same time increasing their value and effectiveness for wood production, outdoor recreation, and other purposes. This will not prevent floods but will reduce them.

However, water storage is not the greatest service performed by forests in the direction of flood control. More important than water storage is their influence in preventing soil erosion, which after all is the problem most vital to the Mississippi Valley. Floods in the lower valley threaten periodically a region embracing a total of 30,000 square miles, but soil erosion is nibbling constantly at the fertility of the 1,225,000 square miles of watershed contributing to flood run-off.

The whole world knows that the Mississippi flood of 1927 temporarily inundated a total of about 18,000 square miles, much of it cultivated. But few know or care that because of soil erosion 1842 square miles of plowed land in four small tributary drainage units just east of the bottom lands in Mississippi was abandoned between 1920 and 1925. Combined, the four units had a gross area of only 13,336 square miles. The abandoned plowed land of the five year period was therefore over 13 per cent of the gross area. In one unit 50 per cent of the plowed land was abandoned within the two dates.

These cases are exterme examples of what is taking place in many parts of the Mississippi watershed. In the aggregate it is reasonably certain that a greater acreage of farm land has had its value for cultivation permanently destroyed by soil erosion during the past five years by floods on the Mississippi watershed than the gross area endangered by inundation from Cairo to the Gulf.

Undoubtedly more poverty and suffering have resulted from soil erosion than from floods, but it creates no thrilling spectacle, gets no newspaper headlines and no Red Cross relief. And yet the family that is driven from its home by gully washing is a flood sufferer whose misery is no less acute because comparatively unknown.

Land with erodible soils having a slope so slight as 3¾ per cent will under the ordinary rainfall conditions of the great agricultural sections of the Mississippi Valley lose on the average, either as bare or cultivated land, twenty-three tons of soil per acre annually. The cultivation of lands with a much greater gradient, even up to two or three times as great, is not uncommon, with erosion increasing at a greatly accelerated rate.

Silt in a stream not only increases its volume but also multiplies its power to destroy. It gives it an abrasive capacity not possessed by a clear stream. Forests are the best means of checking erosion. Streams originating in timber-covered hills are clear and pure.

Forests cannot remove from the Mississippi all its great burden of silt, amounting annually to somewhere between half a billion and a billion tons. They can, however, if maintained on steep lands largely reduce this silt burden as well as assisting in regulating the streamflow. Forests cannot prevent floods on the Mississippi, but can be made to materially increase the safety factor of levees and other protection works. Reforestation would also extend the periods of usefulness of such works. It is a self-evident fact that a balance must eventually be established and maintained between the amount of silt annually received by the river between the levees below Cairo and the amount discharged into the Gulf of Mexico. If the amount received greatly exceeds the amount discharged into the Gulf of Mexico, the day of flood destruction must come sooner or later. It is cheaper and better to keep rich soil on hillside slopes by growing forests than to per-

mit its accumulation in the river channel. This forests can do for the Mississippi River, while at the same time furnishing to the industrial population of the valley a class of raw material which thus far in human history has been found essential to progress and prosperity.

A Policy for the Mississippi

By Arthur E. Morgan

President, The Dayton Morgan Engineering Company, Vice President American Society of Civil Engineers, President, Antioch College

In the course of the material growth of America we find, beginning about the middle of the last century, a development which is revolutionizing our civilization. It is the application to our practical problems of processes of exact and fundamental scientific analysis and synthesis, to replace the age-old methods of rule-of-thumb approximation. The searcher for ultimate beginnings may trace this process in America back to David Rittenhouse, who was described by Thomas Jefferson as the greatest mind of his age. As with a great river, there may have been many independent beginnings, all contributing to swell the main stream to a volume where it would affect our national life.

One of the early exponents of this new and revolutionizing spirit was James B. Francis of Massachusetts. About 1850, not satisfied with the crude methods then in use for the measurement of flowing water, he carried through the Lowell hydraulic experiments which became a model of clear, accurate engineering analysis.

Application of Scientific Methods to Engineering Problems

The spirit of Francis inspired the engineers of the Metropolitan Water Board, which was the agency for supplying water to Boston and its suburbs. Here, for perhaps the first time in America, we have an example of a great public engineering development carried out in a truly scientific spirit, with rigorous scientific analysis and design.

When the New York Board of Water Supply started on the great project of bringing water from the Catskills to New York City, the work at Boston was coming to completion, and Waldo Smith, Chief Engineer of the New York project, was able to get from Massachusetts some good men already well trained in large works of that particular type, to supplement those developed in New York. The work done under his direction stands out as one of the finest applications of scientific methods to engineering problems.

In 1913, when the writer undertook to organize the engineering forces of the Miami Valley flood control project in Ohio, the water supply development in New York was nearing completion, and he was able to secure some of the men who had grown up under the influence of this great tradition. But he was no longer limited to a single source. The spirit of thoroughgoing scientific analysis of engineering problems has taken root in many places, quite largely through the work of our technical schools and universities, and the fifty or more engineers of the Miami project, gathered together by combing the entire country for men of quality, were from a dozen or more distinct fields of training. The technical reports of the Miami Conservancy District constitute a monument to their scientific spirit, and are an effort to pass on to posterity the contributions they had received from the past.

Little by little the methods of thoroughgoing scientific analysis and synthesis are supplementing, enlarging

and perfecting the methods of the "practical" engineer which were based on first-hand experience and informal judgment or intuition. But the process is far from complete. Within a year the writer has been asked to pass on the plans of two great public water control projects in widely different regions, which show very little signs of being influenced by modern engineering methods.

In each case millions of dollars are being badly spent, and there is a blind fumbling about for a solution. The problems are too great to be solved by informal judgment based on everyday experience. They can only be well handled with clear rigorous scientific analysis, based on carefully collected data, and this method is as yet none too familiar to those in charge. In nearly all American engineering there is much scientific analysis of details, but it is a far cry from the rule-of-thumb work of a century ago to the modern projects where analysis is rigorous, thorough and all-inclusive, and where there is an adequate examination of every possibility. Very often we find the most conscientious and exact analysis of the details of design, while at the same time the main features are determined by guess, intuition or tradition.

RULE-OF-THUMB METHODS IN THE MISSISSIPPI PROJECT

But what has all this to do with the problem of the Mississippi? Just this, that the administration of the Mississippi furnishes the outstanding example in America of a great engineering project which still in its main outlines is being handled by rule-of-thumb methods. The problem is so vast and so complicated that it is impossible of economical mastery except by the most thoroughgoing, comprehensive and vigorous scientific analysis, and yet, considering the problem as a whole, these methods never have been applied.

Perhaps the word "never" is not correctly used, for from 1855 to 1860 two Army engineers, Humphreys and Abbot, made a study of certain characteristics of the river which still stands as a masterpiece of engineering research. But there was no apostolic succession. There has been much desultory scientific study of details on the Mississippi, but no comprehensive and exhaustive analysis or synthesis.

A brief account of Mississippi flood control may help to an understanding of the situation. Along the Mississippi River, from Cairo at the southerly tip of Illinois, to New Orleans, a hundred miles from the Gulf, the banks of the river are higher than the lands farther back. The first farming was along these high banks. Slight overflows were frequent, while very heavy flooding happened only once in perhaps five or ten years, so it was possible for planters to save many of their crops by building little dykes or levees about their farms.

THE MISSISSIPPI RIVER COMMISSION

As time passed neighboring planters joined their levees together, then the several states passed laws for the organization of levee districts, with the power of taxation, and finally the planning and direction of the whole work was taken over by the Mississippi River Commission. The Commission was organized in 1879 by act of Congress. It is headed by an Army engineer who acts as its president, and its membership includes both Army engineers and civilians. Its agents along the river are Army engineers, who are assigned to various stations and are served by civilian assistants. The assignment of army engineers to these stations generally is for short

periods, until recently about two years at a station. The last position of an engineer assigned to the river might have been the administration of an Army post, or the maintenance of a harbor, so there has been small chance to develop special ability in river control. At first the functions of the Commission were advisory, but gradually, with increasing appropriations, its powers have increased.

Throughout this whole process there has been a gradual development of Mississippi control by the enlarging and coördinating of works already in existence. It has been a step by step process, always building the immediate future on the immediate past.

SUCCESSFUL PROTECTION OF THE UPPER YAZOO DISTRICT

A typical case will illustrate the methods used. The most successful of all flood control efforts along the Lower Mississippi are those of the Upper Yazoo Levee District. This district covers the territory from the north line of the State of Mississippi, just below Memphis, to a point perhaps a hundred miles south. The Yazoo Delta, which is the overflow area extending from the Mississippi River to the hills on the east, is one of the most fertile regions of America. It is the function of the Upper Yazoo Levee District to protect most of this area from Mississippi overflow by levees along the river.

About 50 years ago Major T. G. Dabney, a typical old-time Southern gentleman, became chief engineer of this district. He had good intelligence, a dominant personality, excellent political sense, and above all absolute integrity. In other levee districts the elected officials of the district employed the chief engineer. In the Upper Yazoo District Major Dabney was held in such complete confidence by the public that he ruled like an autocrat. No elected official who thwarted his purposes could long hold office.

Money raised by taxes in the Upper Yazoo Levee District was spent for building levees, and not to pay political debts. Contractors got work on their merits, and not by favoritism. An influential planter might insist that the levee be built near the river edge where it would protect his field, but if that would put the levee near a caving bank, the planter's influence would count for nothing. The levee would be set back at a safe distance.

Major Dabney so thoroughly established his policies that since his death several years ago they have been continued. Chief among these policies was the rule that the levees of this district must always be two or three feet higher than those just across the river. Regardless of the size of the flood, the levees of the Upper Yazoo District remained intact because breaks on the other side would provide outlets for the swelling waters. They have held without a break for more than 30 years.

Three conditions made this program possible: First, the integrity, economy and long experience of Major Dabney made all resources count. Second, while the district across the river was recovering from disastrous floods the resources of the Upper Yazoo District were intact and available for building more levees. Third, and of almost controlling importance, the belt of land to be protected back of the Upper Yazoo levees was wider than in other districts, so that a greater number of acres was available for taxation to build each mile of levee.

WEAKNESSES OF THE OLD SYSTEM

Here we had the old system at its best. But it was a rule-of-thumb

system. Major Dabney did not know how much water might come down the Mississippi. He did not know how high his levees would have to be if all other levees should be as high as his. He did not know the silt-carrying capacity of the river nor the exact conditions under which disturbances of flow would take place. As to the feasibility of reservoir control, he was certain there was nothing in the idea, although he knew very little about the presence or absence of sites for such reservoirs, and, I believe, had never understood the principles on which they would best operate.

The writer once spent a month with Major Dabney, and found him to be a man of high intelligence, wide reading, and keen discrimination, but the modern method of rigorous, fundamental and comprehensive analysis was not his. He had never been introduced to it.

That same fundamental criticism holds against almost the entire administration of the Mississippi River. There has been a vast gathering of data, and with reference to many details there has been excellent scientific analysis. But taking the problem in its entirety it has been handled by observance of traditional dogmas, arbitrary rules and unproven axioms. The immediate future has been guided by the immediate past. No one comprehended and mastered the whole problem of the river. Comprehension of the whole problem was impossible, for the data never had been gathered on which such an understanding could be based.

A few specific cases will illustrate this point. After the great flood of 1897 the Mississippi River Commission established a standard levee grade for the entire river below Cairo. This standard grade was to be three feet above the height the water of 1897 would have reached if confined between levees. Now there are several great tributaries entering the Mississippi—the Upper Mississippi, the Missouri, the Ohio, the White, the Arkansas, and the Red. In 1897 some of these were greatly in flood, and others were not. To plan the levee system as though the 1897 flood was typical of all floods was certainly rule-of-thumb engineering.

In 1912 another great flood occurred, and again the levees were broken. (They had not all been brought up to the 1897 standard.) Thereupon a new standard levee height was adopted by the Commission, which was three feet above the 1912 high water, similarly determined. In 1927, as might have been expected, there was a very different distribution of flood waters in the different tributaries, and the rule-of-thumb grade line of 1912 did not fit.

THE "LEVEES ONLY" POLICY

In the choice by the Mississippi River Commission of agencies for flood control there is a long tradition of similar rule-of-thumb methods. About 50 years ago the Commission adopted a policy of "levees only." No conclusive study ever had been made of other methods. The writer has step by step followed back the history of these arguments, in government documents and in technical literature, and always he has found generalizations, assertions and hazy references to former thorough studies, but never any evidence of the studies themselves.

The recent national meeting of the American Society of Civil Engineers, October, 1927, was largely given over to a discussion of the Mississippi problem. At that meeting there was presented the embarrassing spectacle of engineers of national reputation and long experience proposing widely varying and conflicting solutions to this great problem. The reason for this

conflict and confusion is that no one is in possession of the facts.

The Mississippi River Commission, in its absolute faith in the traditional doctrine of "levees only," has held that, except for working out conditions relating to levees and bank revetment, it had all the facts necessary, and has discouraged the thorough, patient and widespread work which must be the basis for any adequate and economical plan. Its members have stated repeatedly and unequivocally that there is no material uncertainty about the cost of complete and final protection. It has discouraged thorough investigation by its statement to the effect that the work was rapidly approaching final completion. Yet today it is unquestionably true that never in the history of the Mississippi River Commission have its estimates of the cost of completing its work been more than 10 per cent or 20 per cent of the true cost. That tragic result of rule-of-thumb engineering would have been unnecessary if the methods of modern engineering analysis had been in control.

A THOROUGH STUDY OF THE PROBLEM NEEDED

What should be done?

First, we should know the facts. Second, we should have a scientific analysis and interpretation of them. And, third, after a comparison of all possible methods and combinations, a comprehensive plan should be adopted.

An emergency is to be met, and first of all we should know what is necessary to bring the river back to its past stage of control. Already much of this work is being done.

With the immediate emergency cared for, the necessary time should be taken and expense incurred to make a study of all phases of the river problem, and to prepare plans for permanent control. Such a study probably would take ten years or more, though much effective work will be possible during that time.

USE FOR A HYDRAULIC LABORATORY

We must understand the behavior of the river. To this end a part of the necessary studies can be made best on the river itself, and part in a hydraulic laboratory. The establishment and maintenance of such a laboratory would help greatly to solve many perplexing problems of river control. It is possible on a small scale to discover many of the laws and characteristics of water flowing on a large scale. Some of the finest hydraulic design ever worked out under the writer's direction was developed by that method.

Along with the hydraulic laboratory there should be a far more thorough and intimate study of the river than has ever been made. At what velocities does it deposit silt? At just what velocities and under just what condition does it cave its banks? To what extent does the whole river bottom move during high water? What would be the effects of outlets and spillways? What conditions are necessary to prevent a shallowing of the channel?

We need to know more about the origins and possibilities of floods. How much has each tributary contributed in the several floods? (Far too little is known on this point.) What is the probable maximum flood on each tributary in 10, 25, 50, 100 and 500 years? What is the probability of coincidence of floods on various tributaries? How would such coincidence affect floods on the main river? What is the effect of levees on these lower tributaries in forcing the water into the main river?

A STUDY OF VARIOUS METHODS NEEDED

We need to know about the feasibility and value of every possible

method of flood control on the Mississippi, and of every possibility of combination of different methods. It might seem on first thought that this would mean an endless job of comparing an infinite number of possible combinations, and that no final and conclusive *best* ever could be reached.

This is not the case. Such an analysis can proceed from the smaller components to the greater, with the orderly, methodical elimination of the less desirable methods, so that the problem moves surely and steadily to the one best solution, which probably will be a combination of many methods. So far as the writer is aware, the first clear statement of such a process of large scale definitive engineering analysis is given in the technical reports of the Miami Conservancy District.[1]

There must be a study of the possibility of diversions and outlets from the main river and from its tributaries, of reservoir control, and of spillways, as well as of control by levees and revetments. There has been much heated argument for and against these alternative methods, but no adequate study of them. There must be a study of the greatest possible combination of flood which it is wise to protect against, and of the methods and devices for limiting damage in case that maximum is exceeded.

For 50 years the public has been made to believe that the Mississippi problem lay in a choice between levees and other methods. Such is not the case. A final correct design without doubt will be a combination of several methods, each used in the places and to the extent that is most effective.

There should be a study of the responsibility for flood damage, to determine whether and to what extent any habits of the northern states have increased flood damage below. The writer is of the opinion, from the most careful study available, that the case of the Lower Mississippi against the north in this respect is almost absolutely unsupported by any evidence. If there is such evidence it should be discovered and carefully weighed.

Unless the Lower Mississippi is to become permanently a pauper region to be cared for by the National Government, there should be a study of the equitable distribution of the cost of protection.

NEED FOR A REVIEW OF THE LEGAL NECESSITIES

The legal necessities of the whole situation should be reviewed. The writer believes that an amendment to our National Constitution may be necessary to give the National Government the power to do work wherever it is most necessary and to assess the cost in an equitable manner. We are now living under a hypocritical fiction. Improvement of navigation, being under federal control, is made the excuse for flood control. By gradual accumulation of precedent we are, in fact, amending the Federal Constitution, but in such a partial and inefficient manner that the Federal Government is acquiring obligation for flood control without the necessary powers for its proper execution. To try to solve the problem of the Mississippi without improved legal machinery will result in distortion and monstrosity. The legal structure of flood control should be as well built and as comprehensive as the engineering design.

Such are some of the types of information that should be collected, and of preparation to be made. Perhaps ten years will be required under good ad-

[1] "Hydraulics of the Miami Flood Control Project." Technical Reports, Part VII, Chapter XII. Published by the Miami Conservancy District, Dayton, Ohio.

ministration to accomplish those purposes.

Given the information, the task remains of synthesizing a comprehensive program. During the whole period of preparation this synthesis would be made tentatively again and again to throw light on the process of gathering information. When a general plan is finally adopted by this method it will have the respect and confidence of the engineering profession and of the nation, and there will not be the conflict of opinion among representative engineers that now characterizes a discussion of the Mississippi problem.

A HASTY SURVEY IS INADEQUATE

The hasty survey now being made by the War Department, in an effort to make up for half a century of unfounded assurance, cannot accomplish in a year or two what is necessary for the preparation of an adequate plan. To present a plan to the present Congress that would, in fact, commit the nation to a far-reaching policy for the Mississippi, would be a great national disservice.

The more courageous and honorable attitude would be to face the issue and to inform the American public of the true facts. It is not impossible that, by the premature adoption of a policy for the Mississippi, the country may be led to the wasting of hundreds of millions of dollars, to find itself 20 or 30 years from now faced with another tragedy, and still lacking the fundamental information on which an adequate plan can be based.

No similar problem of similar size ever has been mastered by men. The issues transcend rule-of-thumb methods. Only a thorough analysis into fundamental elements, with a new and creative synthesis, is adequate. Just as the architect of the skyscraper had to escape from the stone mason, and as the railroad creator had to escape from the horse and wagon, in order to fulfil their destinies, so the engineers who conquer the Mississippi must be able to see over the tops of the levees and to think and to design as scientists. They must stoop to the study of minutest elements, and must reach to a mastery of the whole. That attitude has yet to be in evidence.

Some Essential Principles of Water Conservation

As Applied to Mississippi Flood Control

By Hon. Gifford Pinchot
Formerly Governor of Pennsylvania

THE first need of life on this planet is water. A man can live nearly as many weeks without food as he can live days without water. Moreover, it is the supply of water, and not the area of land, which will limit the number of people who can live in the United States. We have land enough for vastly greater crops and hence for a vastly greater population than we have water enough to sustain or produce.

Running water in rivers and source streams, therefore, is the most important of all natural resources, more important in certain ways even than the forest, and that is a large admission for a forester. Twenty years ago the studies of McGee showed for the first time the real position of water in the economy of the Nation.

Not only food supply, but the supply of clothing and the supply of wood are dependent upon the presence of water in sufficient quantity for vegetable growth. Water, moreover, is a cheap carrier of bulky goods, a source of vast and perpetual mechanical power, a carrier away of noxious wastes, and a giver of health, vigor, and delight through recreation.

At the same time water uncontrolled may become a destroying agent of the first rank. The greatest natural calamity in the history of the United States is the recent Mississippi flood. That such calamities are confined to no one river system is proved by the still more recent disaster in northern New England.

Soil conservation is largely water conservation. The prevention of erosion is a question of handling water, while the getting or foregoing of new acreage through swamp drainage likewise depends upon the handling of our water supply.

In dealing with water, the law gives the public a freer hand than in dealing with other natural resources. Land, for example, may be owned absolutely in fee simple. But running water in its nature is a fugitive thing, and it is not subject like land to absolute private ownership.

You may use the stream which runs by your door, but it is not your stream. Others have rights in it also. The law, consequently, gives the state large powers over it, much larger than any powers the state has over land.

As to water, the public right is dominant, the private right subservient. Moreover, wherever its use affects navigation, albeit indirectly, the authority of the Federal Government is supreme.

We have made but a poor use of these large public powers over water. Our dealings with our rivers have been haphazard, uncoördinated, wasteful, political. It is well to remember that famous river in Texas where it was proposed to spend the money of the Nation not only to dig a navigable channel, but to build pumps enough to put water in the channel when dug.

Our dealing with water has been the result of viewpoints and habits acquired when we had abundant water supply for a sparse population in a humid climate. These habits, legal and otherwise, were found to be un-

suited to the same sparse population in an arid climate. We were obliged to adopt legal principles outside the English common law to meet physical conditions outside the experience out of which that common law had sprung. Eventually we shall have to consider how far the common law principles have become unsuited to a dense population even in a humid climate, but that time is not yet.

Nation, state, municipality, corporation, and individual citizen have each dealt with water here and there from time to time as need arose without comprehensiveness of view, consistency of purpose, unity of method, or coordination of effort. The times are ripe for a change in policy.

Two decades have passed since Roosevelt's Inland Waterways Commission, in a sane and courageous report, summoned all men of intelligence and vision to unite behind a wise and foresighted policy for the control and development of our river systems. Such a policy, to take the place of the selfish, scrambled, local policies which have hitherto stood in the way of the comprehensive and effective development of our rivers, must be built upon principles or considerations such as the following:

WATER CONSERVATION PRINCIPLES

Every stream and every river system is a unit from its source to its mouth, and common principles and one general policy should control in all uses of it and dealings with it throughout its whole extent.

The common plan and policy should take carefully into account all of the different ways in which water can be made to serve mankind, such as domestic water supply, industrial processing, sewage and waste disposal, irrigation, draining, power, navigation, and recreation.

When any of these uses are mutually exclusive, preference must always be given to the higher use over the lower, usually in the order of domestic supply, waste disposal, irrigation, power, and navigation.

All uses of the water and benefits to be derived from its control should be kept carefully in view. One of the greatest dangers to wise and effective stream development is that undue emphasis on local or temporary advantages will make forever impossible the complete utilization of the resources of the stream.

The authority and undertakings of Nation, states, municipalities and individuals should be pooled to attain a common object and execute the several parts of a common program.

In executing such a common program it is of the first importance that all existing National, state, and municipal public rights of control and public property rights shall be maintained unimpaired.

In establishing control of any stream or any river system for flood prevention or any other purpose, every useful and available means of establishing such control, including levees, spillways, soil conservation, forest conservation, storage reservoirs, and any others, should be considered and made use of to the fullest practicable extent.

In all projects for stream control, the feasibility of securing repayment, in whole or in part, of the expense of such control from the development of electrical power through storage and other reservoirs, and from assessment of resource values directly created by such reservoirs, should be fully considered and put to use when available.

The execution of the new policy and plans under it should be taken wholly out of politics and put beyond the hazards of annual appropriations.

The allotment of costs between the

National Government and local interests should be established in each case upon the basis of the local benefits to be conferred and the ability of the localities to pay.

THE KIND OF COMMISSION WE NEED

The foregoing brief statement indicates partly, but only partly, the complexity and reach of the problem of controlling such a river system as the Mississippi River. As the largest conservation problem ever undertaken by any nation, and as affecting most vitally the vast central valley of the United States, this gigantic adventure of bridling the Mississippi deserves the best skill and experience this country can provide.

The Mississippi problem is the biggest half of our waterways problem and it consists of two parts. The first concerns immediate relief for the situation of the moment; the other, the permanent cure of floods and the complete utilization of the Mississippi River system. The preparation of a plan for the latter should be attempted only under the direction of the most competent men this nation can supply.

My suggestion is that a commission consisting of the foremost engineers and experts in every one of the lines involved—electric, hydraulic, forestal, agricultural, social, financial, and any others—should be selected for two purposes: First to acquire or assemble the necessary basis of fact concerning the Mississippi system—facts which the Army Engineers have most unfortunately neglected to secure; and secondly, upon the basis of these facts to prepare a general plan under which this vast undertaking may fairly be expected to produce results.

It is now proposed by certain interests to entrust this enormous task to the Corps of Army Engineers through the Mississippi River Commission, which it dominates. These two bodies, by their insistence on the policy of levees only, long after repeated disastrous floods had proved it unsound, have committed, in my opinion, the most colossal engineering blunder in human history. To leave the future of the Mississippi in the hands of these same men would be to certify failure in advance.

If this plan to employ the foremost experts in this, the foremost conservation enterprise of mankind, is sound, then the same general procedure will apply, in its degree, to other similar but smaller undertakings. The essential thing is to make use of the best we have in knowledge, experience, and achievement, and to learn from the blunders of the past how to avoid falling into the same pit.

The St. Lawrence Waterway Project

By FAYETTE S. WARNER
University of Pennsylvania

THE St. Lawrence Waterway Project, from the engineering point of view, consists in the canalization of the St. Lawrence River, making it available to ocean-going vessels, from Montreal Harbor to Lake Ontario.

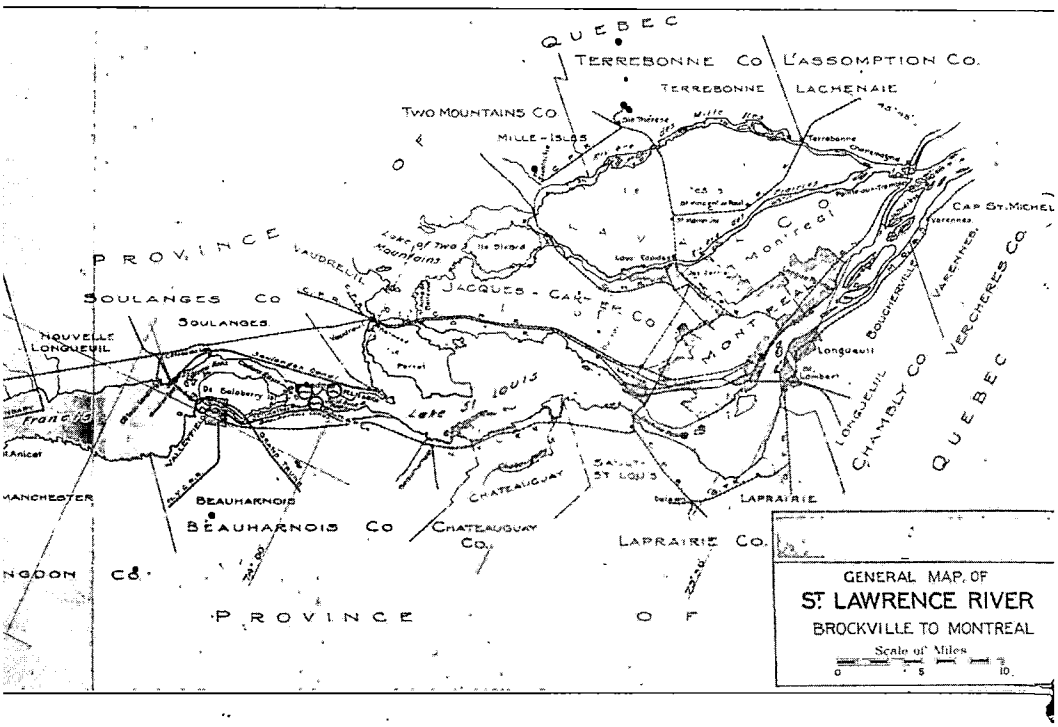
This portion of the river, a distance of some 182 miles, flows over an undulating plain in which it has carved scarcely any valley. The river has an average width of about a mile from Cornwall to Lake Ontario. Below Cornwall (Plate I), it widens to five or six miles in three places, forming Lake St. Francis, Lake St. Louis and the La Prairie Basin, which are connected by the famous Cedar and Lachine Rapids, respectively. A series of rapids occurs above Cornwall which extends up the river to Prescott. The rapids are caused by the river flowing over bed rock formation which outcrop at these places. It is the drowning of these rapids by building dams at certain proposed points, thus creating large tranquil pools and the connecting of these pools and lakes, with canals and locks, which forms the main engineering problem to be solved. To the engineer the problem is not unsolvable.

Starting from Montreal Harbor, the first division of construction necessary will need to overcome the rise of 8 feet to the level of La Prairie Basin, the drowning of the Lachine Rapids by building a dam near the vicinity of Heron Island and dredging the shoals at the lower end of Lake St. Louis.

It is proposed to locate the first lock about 2000 feet down stream from Victoria Bridge and just north of the Mackay Guard Pier, as shown in Plate II. The locks are to be the same size as those at the New Welland Canal, which climbs the Niagara Escarpment, and will be completed by 1930. These locks are 860 feet long by 80 feet minimum width with sills for 30-foot draft. This lock will raise the level to an elevation of +52 feet.

It might be added that it has been proposed to build a low dam just south of Victoria Bridge and raise the level of La Prairie Basin, using it as a part of the course and gain the use of the low head for power. This plan probably will not be carried out because of the very long dam to be built; the excessive amount of dredging necessary to gain the ship channel; the excessive amount of dike building around the basin and the town of La Prairie in order to protect it from inundation during periods of heavy flow; the necessity of buying a large acreage to prevent property damage; the probable loss of the use of the power-generating units when ice jams occur in the lower St. Lawrence, causing the flood waters to set back over the dam. The return from this low head development would not be great enough to offset the costs.

From Lock No. 1, the course of the route will probably pass through the west approach to Victoria Bridge, necessitating the building of probably two lift bridges to carry a total of three railroad tracks, one electric line and the highway. From this point the course will follow the shore line approximately, passing to the west of Nuns Island. On the river side of the canal a concrete retaining wall backed by an earth fill toward the river and paved to provide against damage by ice and wave action is proposed.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JACQUES-CARTIER Co
MONTREAL Co
CAP St. MICHEL
VARENNES
VERCHERES Co
QUEBEC
NOUVELLE
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Lake St LOUIS
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BEAUHARNOIS
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PROVINCE OF
GENERAL MAP OF
ST LAWRENCE RIVER
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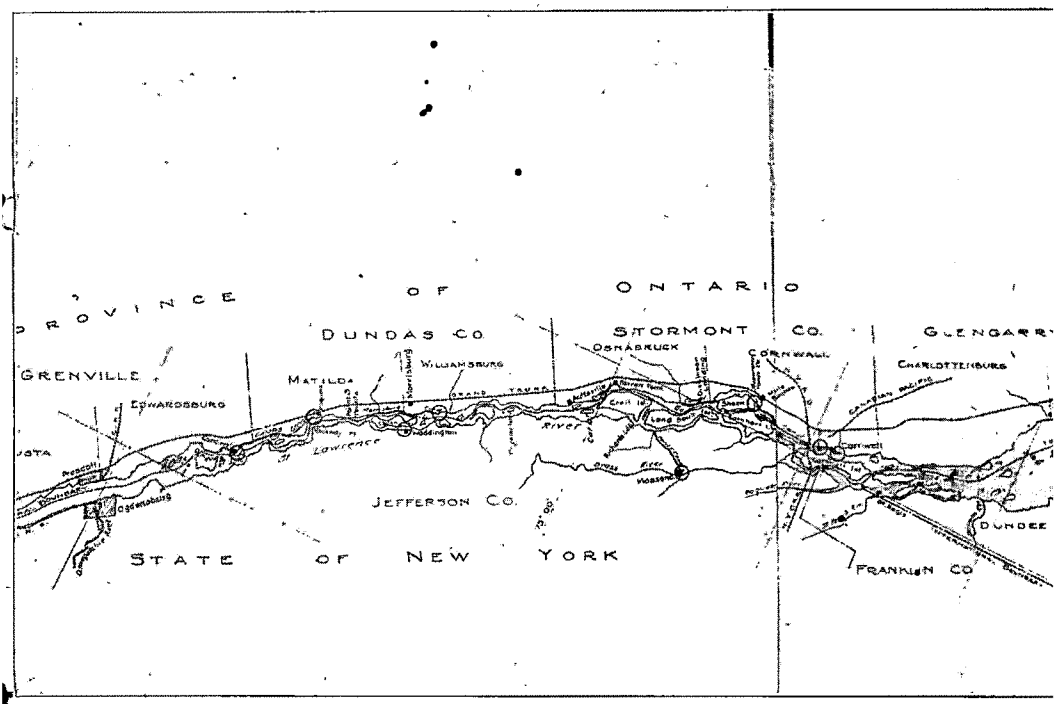
PROVINCE OF ONTARIO
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DUNDEE
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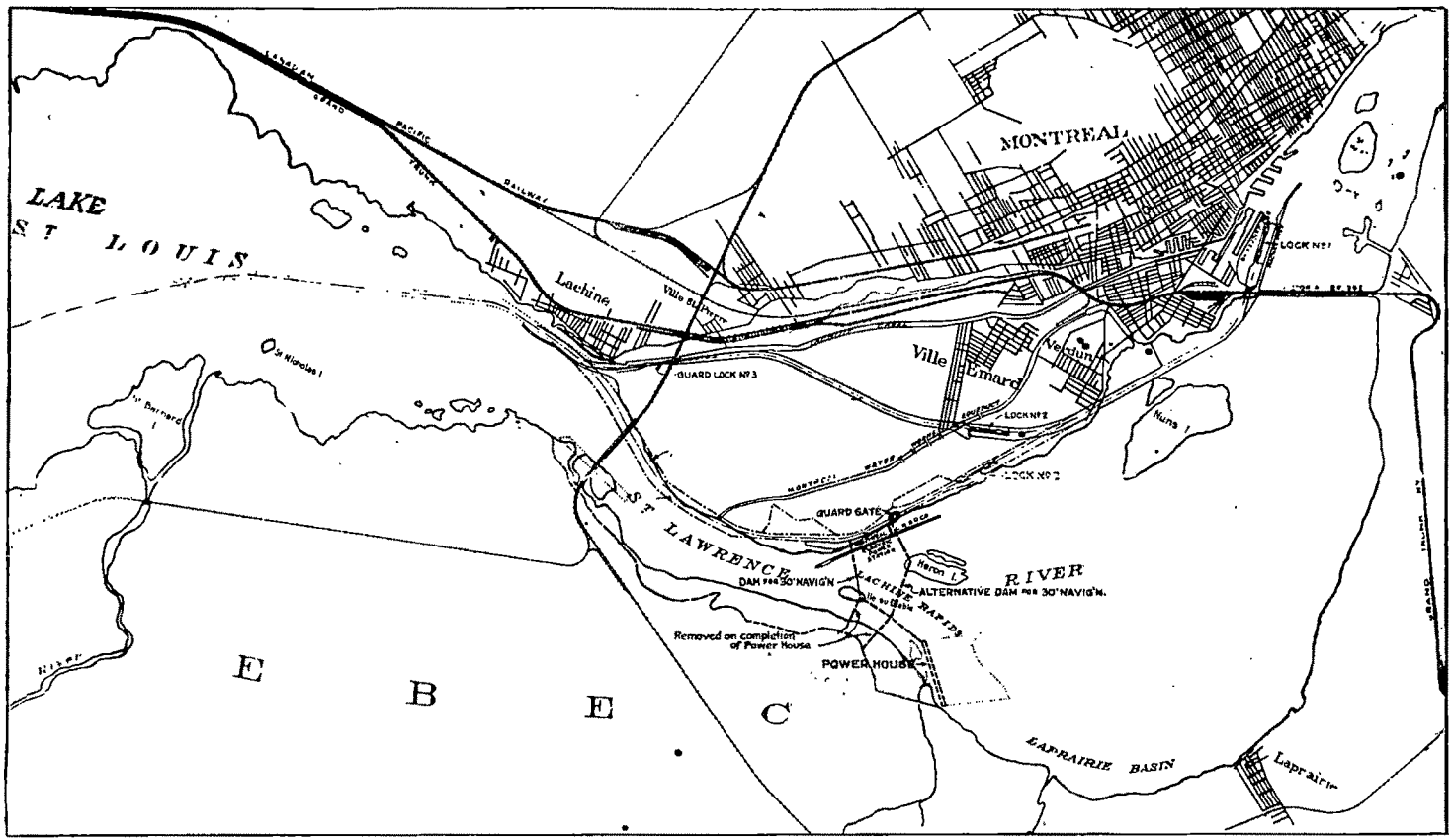


THE LACHINE RAPIDS DIVISION OF THE ST. LAWRENCE PROJECT

There is already a dike on the Montreal side of sufficient height and size to protect the riparian property which will serve as the land bank. It will be necessary to pave it against wave action.

This course continues practically in a straight line about a mile past the village of Verdun, where a second lock will be located. This lock will raise the elevation to that of Lake St. Louis. This plan calls for a dam across the Lachine Rapids some 4000 feet beyond the lock and in the vicinity of Heron Island. Its exact location will be determined by the cost of construction and maintenance of the temporary diversion dam during the construction period.

There seems to be an excellent foundation of rock averaging 2½ to 5 feet beneath the surface of the rapids extending out from both banks from 1000 to 1300 feet. These portions of the dam, then, would be relatively easy to construct. The remaining portion would offer greater difficulty, as the Canadian District Engineer [1] pointed out, because the whole river seems to rush through a gap some 400 feet at a rate of about 30 miles per hour. Several soundings were taken which seemed to indicate that there were several points in the gap which were 200 feet deep. Another heavy cost to be thought of will be the large amount of earth and rock to be removed in order to carry the volume of water to the probable location of the power house, and the still heavier cost of excavating the rock for the tail race, as it is as necessary to take the large volume of water away from the turbines as it is to bring the water to them, in order that they may operate efficiently.

This development will give about 700,000 horsepower, which, according to the District Engineer, could be absorbed by the industries at Montreal and vicinity immediately, if it were available.

The canal channel from the dam to Lachine Wharf will follow the shore line. At this point it will enter the deep water of Lake St. Louis, where there is a stretch of 14 miles of almost unrestricted sailing. The cost of this project is estimated at about $145,000,000.

It is a little less costly for this portion of the route if both the power development and waterway are developed together since there is a demand for the power. If the demand for the power did not exist, it would be less costly to develop the waterway on an inside land route through Ville Emard to Lachine.

The inside route contemplates the power development coming at a later date; but the initial cost of each would be greater, developing them separately than to use the above described route which contemplates developing both the power and Lachine Rapids route at the same time. It is also to be noted that the inside route will be only a 25-foot channel until the power project is completed, whereas the Lachine Rapids route with the power development will be a 30-foot channel from Montreal Harbor through Lake St. Louis.

The second division (Plate III) of construction is the connecting of the upper end of Lake St. Louis with the lower end of Lake St. Francis. The difference in level between the two is 83 feet, Lake St. Francis being at a level of +152 feet.

These two lakes are separated by a series of three rapids, Coteau, Cedar and Splitrock Rapids, over a total distance of about 16 miles. It is possible, and the foundations are such that dams can be built at the foot of each rapid, thus ponding the water. However, this idea can be immediately dis-

[1] District Engineer Yule.

PLATE III

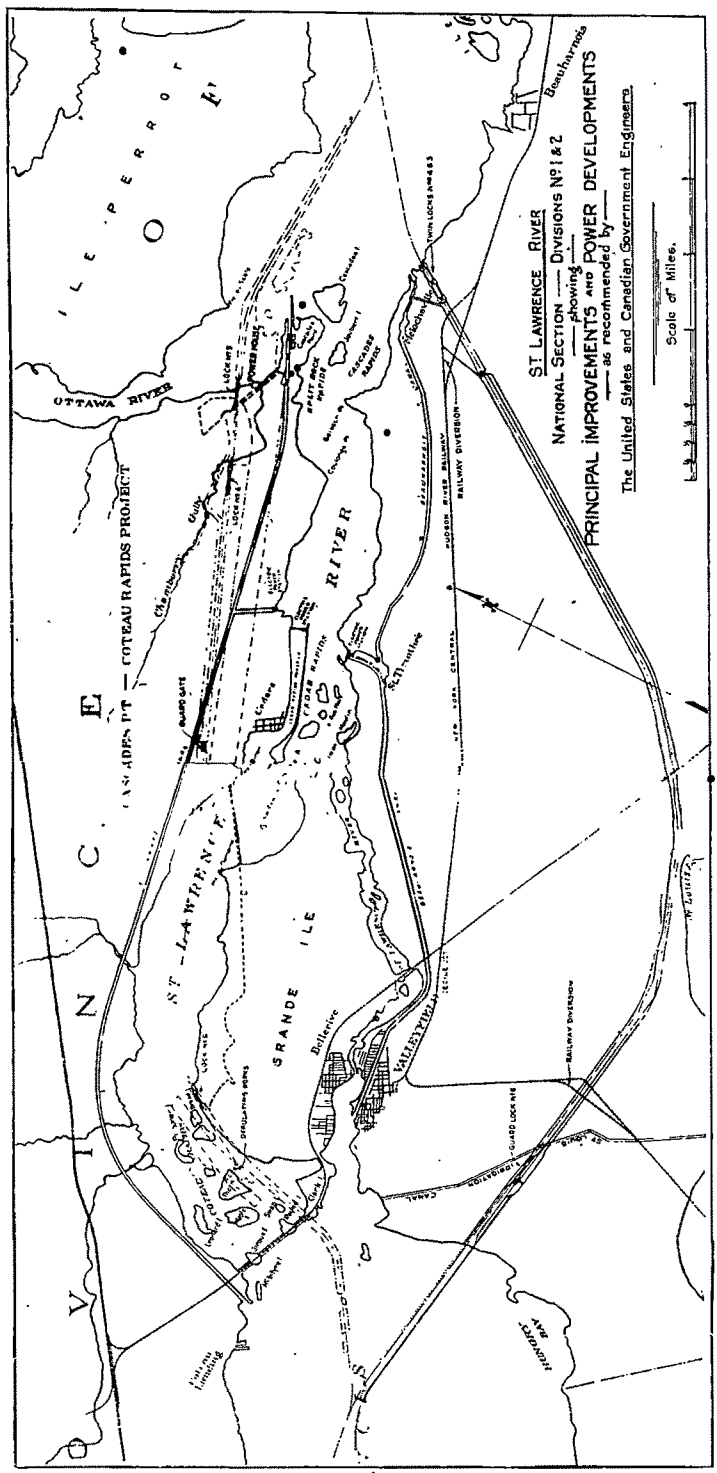
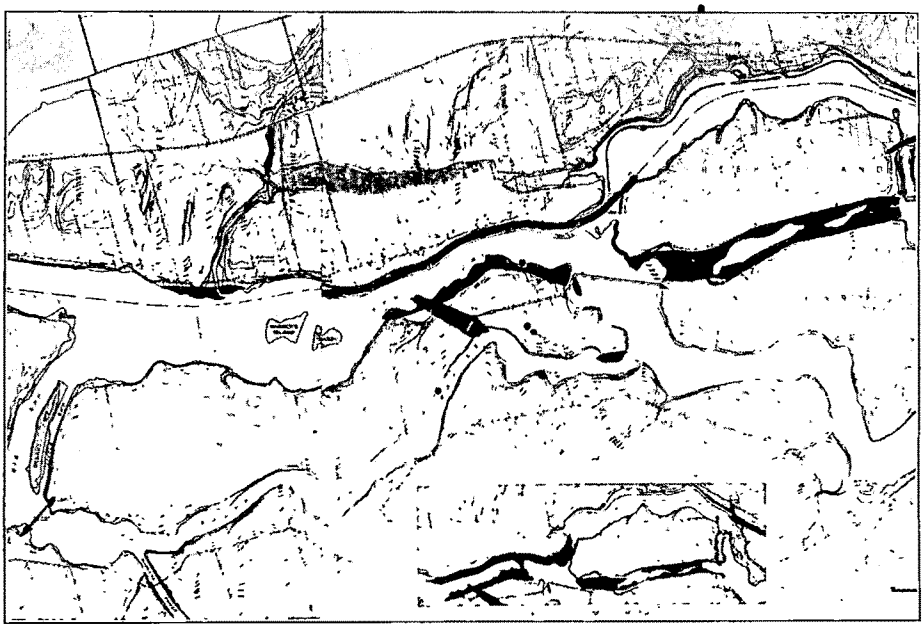

ST LAWRENCE RIVER
NATIONAL SECTION — DIVISIONS Nº 1 & 2
— showing —
PRINCIPAL IMPROVEMENTS AND POWER DEVELOPMENTS
— as recommended by —
The United States and Canadian Government Engineers
Scale of Miles
OTTAWA RIVER
ST LAWRENCE RIVER
GRANDE ILE
ILE PERROT
COTEAU RAPIDS PROJECT
Beauharnois
Valleyfield
Bellerive
Div. 2

PLATE IV



THE BARNHART ISLAND DEVELOPMENT AT CORNWALL — INTERNATIONAL SECTION

missed from practical consideration because of the enormous cost of building diversion dams for the construction period.

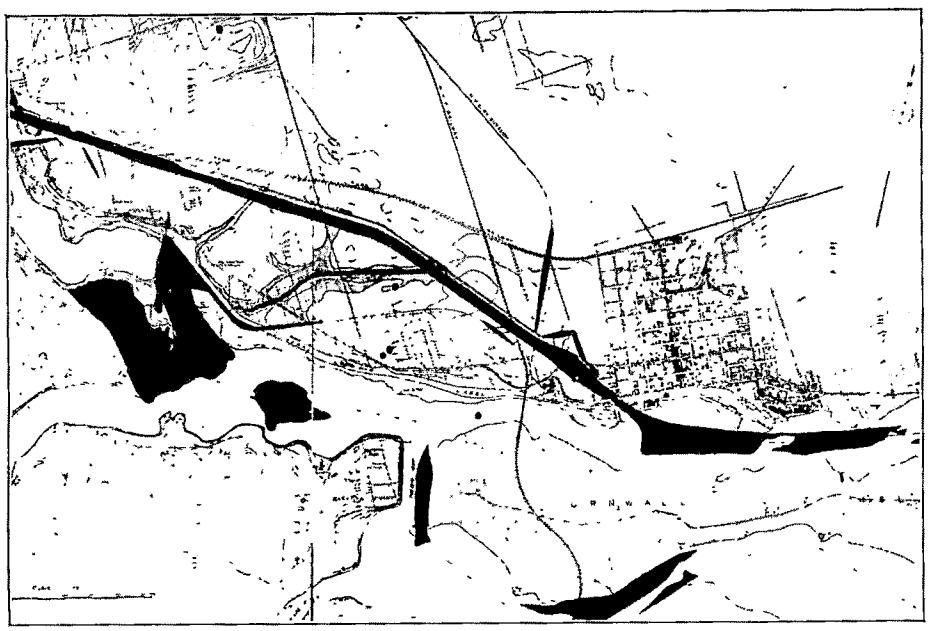
It has been proposed to build a canal around the rapids on the south side of the river. Entrance from Lake St. Louis is near Melocheville. The locks of 41-foot lift each are located not far from the village which will raise the level to that of Lake St. Francis. The foundations of these locks will rest on bed rock. The canal will then continue in a straight line for about six miles, followed by a series of gentle sweeping curves to the right for a distance of four miles. A tangent of three miles brings the canal to the shore of Lake St. Francis.

It will be necessary to dredge a channel of two miles to deep water in Lake St. Francis. The entire canal can be built through Champlain clay with a width of 450 feet at the top, a depth of 30 feet, and a provision for widening to 600 feet in the future at a cost of $40,000,000. This includes all costs, bridges, railroad fills and guard locks at Lake St. Francis. Power can be developed at a later date without any interference with navigation at a cost of $152,000,000 for 1,560,000 horsepower.

If power is developed at the same time that the waterway is built, then another scheme can effect a saving of about fifteen million dollars to the development of power. This scheme can be carried out on the north side of the river, by constructing a dam across the river above the town of Cedars from Point a Brion to Point du Domain, and building a large power canal running back of the village of Cedars to a power house located just north of the point where the present Soulanges Canal enters Lake St. Louis.

The new ship canal would lie north of the power house with the first lock at the entrance and the second further up Chamberry Gully. The plan would

PLATE IV



Div. 4 — Lower Dam

necessitate a guard lock between Broad Island and Grande Island, with an embanked channel and regulating works at Thorn Island; also, dredging from Thorn Island to Prisoner Island in order to care for the heaviest floods and winter conditions.

This plan contemplates a 30-foot channel for $55,000,000 with a very easy power development at a later date at a cost of $125,000,000, or at a total of $180,000,000.

It seems likely that the demands for power will be so great by the time that this project will be completed that it will pay to embark on the second scheme of development rather than the first.

The Third Division of construction is the deepening and widening of the channel through Lake St. Francis. It is a distance of 28 miles and a channel 450 feet wide by 30 feet deep is estimated to cost $1,820,000.

The Fourth Division (Plate IV) of the development, known as the International section of power development, comprises a distance of about 50 miles between Cornwall and Prescott.

The scheme that will probably be used is known as scheme "B" in the International Joint Commission's report which provides for the least amount of land inundated. This scheme calls for a two-stage power development making the total amount of land inundated 6000 acres.

The lower dam and power houses will be located between the lower end of Barnhart Island and the mainland on the Cornwall side intersecting Lock No. 20 of the present Cornwall Canal some three miles above the village. Another dam in this series is to cut off the main Long Sault Rapids and is located at the upper end of Barnhart Island to a point near the lower end of Long Sault Island.[2] The third dam

[2] The investigation of foundations by tunneling under the river was being carried out by U. S. Engineers in the summer of 1925.

will regulate the flow to the Massena Power Canal and connects the upper end of Long Sault Island with the eastern shore.

It will be necessary to carry out considerable dredging and enlarging of the channels in order to care for the volume of water at the several points in this portion of the development. The cut at Polly's Gut must be enlarged in order to care for the swift water and to lower the velocity of the river on the north side of Cornwall Island. A large amount of earth and rock removal are necessary at the Barnhart development; also, the channel must be widened and deepened between Shiek Island and Barnhart Island to bring full delivery to the forebay of the power house. An additional channel and control dam will be placed near the lower portion of Long Sault Island to care for extreme high water and to divert the flow during construction of the Long Sault dam. The proposed waterway channel necessitates a large amount of dredging to be carried out on the north side of Cornwall Island from the upper end of St. Regis Island to a point just southeast of the village where Lock No. 7 will be located. This lock will carry the level to elevation +200 feet. The canal will continue overland for about three miles to Lock No. 8, which will have a life to elevation +210; again continuing in a straight line to the stillwater north of Shiek Island which is created by a dam from the lower end of Shiek Island to the mainland and a dam which already exists from the upper end of Shiek Island to the present Cornwall Canal embankment. From this point to Morrisburg (Plate V), it is practically open water, but it will be necessary to do some dredging between Weaver's Point and the entrance to Lock No. 9 which will be located about a mile west of the village. A dam will be built at this point from the mainland to Ogden Island, from Ogden Island to Clark Island, and from Clark Island to Murphy Point. Two power house developments will be located on either side of Clark Island, while the sluiceway and spillway will be in that portion of the dam that crosses the main section of the river. The Morrisburg dam raises the elevation to +242 feet, thus creating stillwater with only the proper amount of gradient from Morrisburg to Lake Ontario. Some dredging will be necessary above Morrisburg in order that the full amount of water may be easily discharged under a low velocity as it is now being discharged under the high velocity of the rapids. The total amount of water power developed at Barnhart is 1,250,000 horsepower and at Morrisburg 600,000.

The total cost of this division including power, 30-foot navigation and all damages, is estimated to be $212,000,000.

The Fifth Division, from Chimney Point to Lake Ontario, is 65½ miles long, with a fall of about one foot. The channel is deep and wide, having a minimum width of about 500 feet through the Thousand Islands. A few points of rock found above grade of 30-foot channel can be removed for an estimated cost of $100,000.

The total improvement, as outlined, is estimated to cost about $539,000,000, of which about $125,000,000 is chargeable to navigation, and $414,000,000 to power, averaging about $100 per horsepower developed.

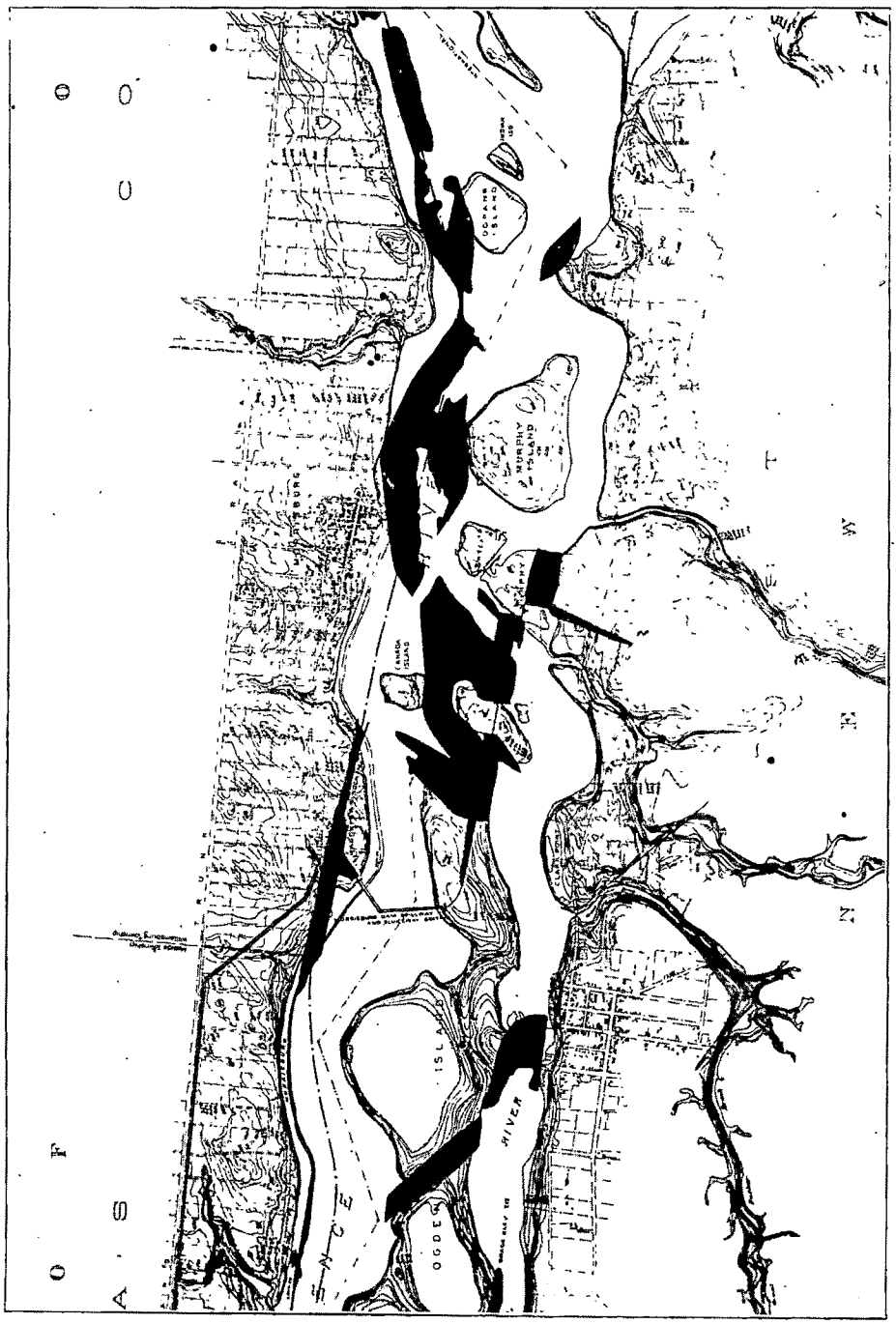
REFERENCES

St. Lawrence Waterway—International Joint Commission Report.

Ontario Hydro-Electric Power Commission Report.

Report on Structural Materials along the St. Lawrence River, Department of Mines, Canada.

PLATE V



THE MORRISBURG DAM — INTERNATIONAL SECTION

Div. 4 – Upper Dam

A Synopsis of the Hoover Report on the St. Lawrence Shipway

By FAYETTE S. WARNER
University of Pennsylvania

THE President appointed a Commission March 14, 1924, to advise upon the development of a shipway from the Great Lakes to the sea. He named the following men to the Commission:

Herbert Hoover, Chairman
William C. Brood of New York
James P. Goodrich of Indiana
James E. Davidson of Michigan
Charles L. Allen of Massachusetts
James R. Howard of Iowa
James P. Noonan of Missouri
Stephen B. Davis, Counsel
Charles P. Craig, Executive Secretary

In 1919, the International Joint Commission between United States and Canada made an investigation of the proposed river improvement between Montreal and Lake Ontario, setting forth its conclusions and recommendations in a report under the date of January 6, 1922. That Commission endorsed a plan for improvement of the St. Lawrence River and recommended that further study be made of the economic and engineering features. Therefore, in accordance with this recommendation a Commission was appointed by the President and a similar one by the Canadian Government known as the National Advisory Committee of Canada. It was agreed by the two governments that a Joint Board of six engineers should be created and a complete survey be made.

By the Rivers and Harbors Act, approved March 3, 1925, an item of $250,000 for this survey was allotted and the Board of Engineers of the United States Army were directed to make the examination.

The Department of Commerce, at the request of the Commission, undertook a full examination of the economic questions involved and its report was completed and transmitted in January, 1927.

All this data together with numerous studies on the part of the members of the Commission have brought it to the following conclusions:

1. The construction of such a shipway from the Atlantic to the Great Lakes, as is proposed, will be of great economic benefit to the lowering of present transportation costs to the interior of the continent and particularly to the region around the Great Lakes. This territory embraces the following states: Ohio, Indiana, Kentucky, Illinois, Iowa, Missouri, Kansas, Nebraska, North and South Dakota, Montana, Wisconsin, Minnesota, Michigan, Pennsylvania and New York. It also includes a large part of Canada.

More than forty million inhabitants not only gain their livelihood from the basic industries within this territory, but produce a large surplus both from agriculture and manufacturing.

The building of the Panama Canal brought the eastern coast nearer to the western in cheaper rates. But the gain was of much greater advantage to the eastern coast region than to the interior.

If we take for illustration the cost in cents carrying a ton of staple goods at the present rate, using the cheapest route, we find that previous to the war, New York was 1904 cents away from

San Francisco, while it is now only 1680 cents. Chicago, which was 2610 cents away from the Pacific coast before the war, is now 2946 cents away. In other words, Chicago has moved 336 cents away from the coast, while New York has moved 224 cents nearer.

Similarly it can be shown that Chicago has moved about 594 cents away from the markets of the Atlantic Seaboard and South America. This same ratio applies to other mid-western points.

The increases in rates have affected this section from 6 to 18 cents per bushel upon grain, while similar increases have not taken place in competing countries, which have greater access to the seaboard. Hence, this deduction of freight rates comes out of the mid-continent farmers' receipts. The effect of completing such a shipway as the proposed St. Lawrence improvement would be to gain a substantial reduction in the cost of transportation, and would be a direct cause for raising the price levels of all grain in the lakes transportation area.

Other industries would be affected by the same type of economic reaction. It has been estimated that the returns in a single year to the farmers would equal the capital cost of the waterway.

2. There are three different routes proposed:

(a) The reconstruction of the present canal from Lake Ontario to the Hudson, using the new Welland Canal now under construction by the Canadian Government to connect Lake Ontario and Lake Erie. The United States has treaty protection in equal treatment in the use of the Welland Canal.

(b) An "All American" route, which would use the same route, but would construct a new ship canal on the south side of Niagara which would duplicate the Welland Canal.

(c) By using the St. Lawrence River under joint agreement with Canada.

3. Depth of Shipway. It is proposed to build all permanent structures for a depth of 30 feet, but to make the connecting canals only 25 feet, as that draft will at present admit 88 per cent of all ships entering American ports.

The capacity of this canal is estimated at 30,000,000 tons per year if a single chain of locks is used. This capacity can be increased to almost any desired amount by constructing parallel locks.

4. The Department of Commerce estimates the following tonnages by routes:

	Minimum Tons	*Maximum* Tons
Ontario-New York route	15,000,000	20,000,000
St. Lawrence route	21,000,000	25,000,000
Median.....	17,500,000	23,000,000

80 per cent represents imports and exports.
20 per cent represents internal traffic.

5. The United States Engineers report of December 6, 1926, estimate the cost of construction of a ship canal: Lake Ontario-Hudson route, $506,000,000; All American route, $631,000,000; St. Lawrence route, $123,000,000 to $148,000,000, depending upon the quantity of hydro-electric development. The All-American or Lake Ontario-Hudson routes would not develop power.

6. The development of the St. Lawrence for power is inevitable. Complete development will give about 5,000,000 installed horsepower of which 2,250,000 horsepower lies in the international section. It is profitable to develop this river for power, and this would eventually create a shipway even though the other routes are undertaken.

7. The requirements for power by the Province of Ontario, New York

and New England States will be great enough by the time the project in the international section is completed to absorb the entire output.

The development of power of this section with an additional expenditure from $22,000,000 to $34,000,000, depending upon the details as to whether it is a two-stage or single stage, for locks and canals would carry the shipway 141 miles out of the total 183 miles from Lake Ontario to Montreal, or within 42 miles of tidewater. There are two plans, first, by building a shipway around the rapids completely independent of any future power development, and second, by making use of a partial development in order to offset future costs to the complete development of power.

The first method will cost about $97,500,000, while the second would cost about $161,000,000. The second method is recommended by the Joint Board of Engineers.

9. It is possible that other agencies than the governments themselves will be given the right to develop the power. However, the undertaking is of such a nature that the power development and navigation project will probably be carried out as a joint one between the United States and Canada.

The method as to how the costs shall be shared by the two countries has not been determined.

10. Comparison costs of maintenance with interest at 4½ per cent of the three routes are:

	Per Year
All-American	36,000,000
Lake Ontario-Hudson	28,770,000
St. Lawrence	$10,000,000

These estimates applied to the annual tonnages on these routes are:

	Per Ton
All-American	$2.06
Lake Ontario-Hudson	1.64
St. Lawrence	.43

11. Comparison of restricted navigation routes:

	Miles
All-American	137
Lake Ontario-Hudson	128
St. Lawrence	25

Obstructions to navigation:

	Locks	*Bridges*
Lake Ontario-Hudson	20	54
St. Lawrence	9	8

The St. Lawrence route is nearer northern European ports by 625 miles than would be the Lake Ontario-Hudson route; but it is 1,550 miles further to New York and from 450 to 1,350 miles further to South Atlantic ports. These distances, however, are compensated for by better navigation in the St. Lawrence route.

12. The time required for construction has been estimated to be eight years, but it may be assumed that ten years will be the minimum period even though all international questions, legislation, administrative and financial problems can be rapidly overcome.

13. It is hardly necessary to discuss the military advantages of one route over the other, but they may be summed up in the words of the Chief of Engineers: "The military advantages of the proposed waterway across the State of New York are not sufficiently great enough to affect the consideration of a matter involving hundreds of millions of dollars. It will be noted that many points of both routes are so close to the border as to make them subject to possible destruction in case of war."

14. It is noted that the State of New York has a special interest in the development of power on the St. Lawrence route, but owing to the international character of the river, it will be necessary that the Federal Government assent to and negotiate power development questions from the American side.

15. It is feared by some eastern seaboard cities that in case the St. Lawrence route is constructed that they will lose some transfer and shipping business.

It may be stated that the total estimated tonnage for this route equals only 4 per cent of the present tonnage carried by the American Railway systems which now connect the Lakes with the Altantic Seaboard. It is equal to only 12 per cent of the shipments now moving through American sea ports. It is theoretically possible that the natural increase in traffic during the years of construction will increase to enough to completely offset any decrease that may come to American seaboard ports.

The conclusions of the Commission are:

1. The construction of the shipway from the Great Lakes to the sea is imperative.

2. The shipway should be constructed on the St. Lawrence route, provided suitable agreement can be made for its joint undertaking with the Dominion of Canada.

3. That the development of the power resources of the St. Lawrence should be undertaken by appropriate agencies.

4. That negotiations should be entered into with Canada in an endeavor to arrive in agreement upon all these subjects.

Engineering Aspects of the St. Lawrence Waterway

By G. B. Pillsbury
Lieutenant Colonel, Corps of Engineers, U. S. Army

THE purpose of the St. Lawrence Waterway is to afford an efficient water transportation route from the Great Lakes to the sea. Its engineering aspects deal primarily with the best means for creating such a highway for deep-draft shipping. But this is only part of the problem. The portion of the St. Lawrence that now remains a bar to such shipping has potential power resources whose eventual development will be an economic asset of far-reaching importance to the two nations concerned. The engineering problem is then to find the best means of co-ordinating improvement of the river for through deep-draft navigation with the immediate or ultimate development of its power resources.

From the point where it leaves Lake Ontario, the St. Lawrence lies along the boundary between the United States and Canada for a distance of 115 miles, with the Province of Ontario on the north and the State of New York on the south. The river then leaves the boundary and flows through the Province of Quebec to the Gulf of St. Lawrence. The port of Montreal lies 180 miles downstream from Lake Ontario.

From Montreal to the sea, the Dominion of Canada has already provided a channel thirty feet in depth at low water, which has made that city one of the great ports of the continent. A project is under way to enlarge this channel to a depth of 35 feet. The part of the river which bars Lake navigation from the sea, and ocean navigation from Lake Ontario, is therefore the 180-mile reach from that lake to Montreal. In this reach the river falls a total of some 225 feet over three successive series of rapids, lying between long stretches of deep, slow flowing water and expansions of the river course into lake reaches.

It is to be anticipated that hydroelectric generating machinery with a total installed capacity of some 5,000,000 horsepower will eventually develop the power economically utilizable from the large and uniform river flow through this section. More than half of this potential power lies on the portion of the river within the Province of Quebec.

The Great Lakes are of necessity an integral part of the waterway system of which the St. Lawrence Waterway would form a part. Each of the lakes has, it is needless to say, a depth adequate for vessels of any practicable draft, and the Straits of Mackinac, between lakes Michigan and Huron, also have ample depth for any navigation. The rivers connecting the other lakes are the limiting factor in determining the depth available for shipping on the lake system.

Improvement of Interconnecting Channels

The interconnecting Channels from Lake Superior through Lake Huron into Lake Erie have been improved by the United States Government by channel excavation, and by the construction of four parallel locks at St. Mary's Falls, at the outlet of Lake Superior, to afford a transportation route normally available for vessels of 20-foot draft. Canada has contrib-

uted a fifth lock at the St. Mary's Falls. The recent low water levels on the lakes, due to a cycle of low precipitation on their drainage basin, and to the diversion of water from Lake Michigan by the Chicago sanitary district, reduced the available draft at one time to as little as 18 feet. The draft that can be carried at the present time is about 19 feet. A report on the advisability and cost of a further improvement of the interlake channels has been directed by Congress and is in preparation.

The transportation route afforded by the channels between the lakes has given rise to a water commerce of great volume, moving upward of 100,000,000 tons of commerce per annum. Most of this commerce consists of bulk cargoes of iron ore, coal and grain, carried in a special type of vessel, longer and of greater capacity than the ordinary ocean cargo carrier, but of lighter draft to meet the limitations of the channel depth. With the loading and unloading machinery provided at the lake ports, the transportation of bulk freight has reached an unparalleled standard of efficiency.

Lake Ontario lies at an elevation 326 feet below Lake Erie. Navigation from Lake Erie to Lake Ontario passes through the Welland Canal, constructed and operated by the Dominion of Canada. The present Welland Canal affords a depth of 14 feet and overcomes the difference between the levels of the lakes by a series of 25 lift locks. Canada has now under construction a new Welland Ship Canal, generally paralleling the present canal. It is 25 miles in length, with but seven lift locks and a guard lock. The lock sills are set to afford a depth of 30 feet. The portions of the canal first excavated were given a depth of 25 feet; the later contracts provide for a depth of 27 feet.

From Lake Ontario to Montreal 14-foot navigation is now provided by side canals around the rapids in the St. Lawrence and by such channel excavation in the river as has been necessary for this draft.

The present Welland and St. Lawrence Canals form the connecting link, via Lake Ontario, between the general lake system of navigation and deep water at Montreal. This route is navigated by vessels of 14-foot draft, similar in design to the lake freighters, but of much smaller dimensions. They are relatively high-powered to meet the swifter currents of the St. Lawrence. The commerce via this route has been increasing rapidly in recent years, and is now somewhat in excess of 6,000,000 tons per annum.

In summary, navigation on the Great Lakes and the St. Lawrence now falls into three categories:

(a) Lake navigation, operating normally on 20-foot draft, on and between all the Lakes except Ontario.

(b) Canal navigation, 14-foot draft, between Lake Erie ports and Montreal via the Welland Canal, Lake Ontario and the St. Lawrence.

(c) Deep-sea navigation from Montreal to the ocean.

When the new Welland Ship Canal is opened, lake navigation will be extended to Lake Ontario, and will then be separated from deep-sea navigation only by the 180 odd miles of the St. Lawrence above Montreal. But if the St. Lawrence gateway was then opened, vessels exceeding 20 feet in draft would not be able to penetrate into the lakes beyond Lake Erie until the interlake channels are deepened.

IMPROVEMENT OF THE ST. LAWRENCE BETWEEN LAKE ONTARIO AND MONTREAL

Since it is in part a boundary stream, the improvement of the upper St. Lawrence is an international project.

Plans for the improvement of the river between Lake Ontario and Montreal were prepared in 1921 by a board composed of one engineer for the United States, and one for Canada. These plans were presented to the International Joint Commission, a permanent body created by treaty to deal with matters relating to the boundary waters between the two countries. The Joint Commission recommended that the two governments enter into a treaty arranging for the improvement of the river between Lake Ontario and Montreal. As it had received certain alternative plans for improving the international portion of the river for navigation and power, it further recommended that all plans presented be reviewed by an enlarged engineering board. In 1924 the two governments appointed such a board, known as the Joint Board of Engineers on the St. Lawrence Waterway.

THE JOINT BOARD OF ENGINEERS

The membership of the board was, for the United States, Major General Edgar Jadwin, Chief of Engineers, U. S. Army, Col. William Kelly, Corps of Engineers, U. S. Army and the writer; for Canada, Mr. Duncan W. McLachlan, of the Department of Railways and Canals, Dominion of Canada, Mr. Oliver O. Lefebvre, Chief Engineer, Quebec Streams Commission, and Brig. Gen. Charles Hamilton Mitchell, C.B., C.M.G., Dean of the College of Engineering of the University of Toronto. The report of this board was submitted on November 16, 1926, and appendices to the report, containing detailed discussions, plans and estimates, were filed in July, 1927. Under the instructions formulated by the two governments the report of the board included findings on certain collateral questions, such as the effect of diversions of water from the Great Lakes on the levels of the lakes and of the St. Lawrence. There will here be considered only that part of the report which deals with the St. Lawrence itself.

REPORT OF THE BOARD

The St. Lawrence leaves Lake Ontario as a deep, slow-flowing stream, split in places into many channels by the Thousand Islands and other island groups. At a distance of 67 miles from the lake the first rapids are met, and rapids and swift water continue through the remaining 48 miles of the international border. The most spectacular of these rapids are the Long Sault, near the foot of the reach. Leaving the border, the river expands into the quiet water of Lake St. Francis, which extends for about 27 miles. The river then drops through a succession of rapids, 15 miles in length, to Lake St. Louis. Lake St. Louis is 15 miles in length. From the lake the river passes in a turbulent course some 10 miles to Montreal Harbor. The famous Lachine Rapids lie in this last section.

The enormous reservoir of the Great Lakes equalizes the flow of the St. Lawrence and gives it an unparalleled uniformity of discharge. The river has no floods and no low water. Except where winter ice jams back up its levels, the range between high and low water marks is but a few feet. The minimum recorded monthly mean flow of 174,200 cubic feet per second in the upper St. Lawrence would be a flood on the Colorado; the maximum flow of 318,000 cubic feet per second would be low water on the lower Mississippi. In comparison the outflow from the Ohio ranges from some 30,000 cubic feet per second to some 1,500,000 cubic feet per second between low water and flood.

The large dependable discharge of

the St. Lawrence gives the river its great power possibilities. Moreover, because the flow is uniform, the river is not an eroding and silt-bearing stream. Its course has long since adjusted itself to the flow which it carries, and consequently it runs as a clear blue stream between stable banks. Surveys of the bed made 50 years ago are still reliable. There will be no problem in the maintenance of channels in the river after they are once excavated.

There are consequences of the uniformity of flow which are not so fortunate. Since the river does not erode its bed and banks it has not cut itself a deep valley. It flows generally but little below the natural surface of the ground. Since there are no floods the land has long been occupied and improved almost to the waters' edge. The construction of dams, to convert the rapid sections of the river into ponds, for the joint benefit of navigation and of power, will cause, therefore, large overflow damages. While the compensation for such damages is a relatively small item of cost in any plan of improvement, there is, on sentimental grounds, a demand that flooding be reduced to the minimum consistent with the public benefits resulting therefrom.

Again, since there are no marked low-water seasons on the St. Lawrence, the unwatering of the foundations of dams and other structures in the river becomes a major engineering undertaking and adds greatly to the cost of the works.

An essential feature in the preparation of plans for the improvement of the St. Lawrence is a reliable knowledge of the foundation conditions for the various structures. The Joint Board of Engineers supplemented the information previously available by some 450 borings, many of which were cored well into rock. In addition a special examination was made to verify the continuity of the rock under a proposed dam site at the Long Sault Rapids, where swift and broken water prevented the use of ordinary drilling methods. Shafts were sunk into rock on each shore, and from the bottom of these shafts horizontal diamond-drill borings were driven under the river bed. The results of all of these investigations show that suitable foundations are available for the various structures planned.

It is convenient to consider the St. Lawrence in five sections. Using the designations employed by the Joint Board of Engineers these are:

The Thousand Islands section, 67 miles in length, embracing the deep, slow-flowing part of the river from Lake Ontario to the first rapids.

The International Rapids section, 48 miles in length, embracing the rapids and swift water extending along the international boundary to Lake St. Francis.

The Lake St. Francis section, extending 26 miles to the end of deep water at the foot of that lake.

The Soulanges section, 18 miles in length, extending from deep water in Lake St. Francis to deep water at the head of Lake St. Louis.

The Lachine section, 23 miles in length, extending through Lake St. Louis and the rapids below them to Montreal harbor.

The improvement of the Thousand Islands section is solely a matter of removing certain dangerous rock reefs in the river, and of cutting back a few projecting points in the narrow parts of the channels between the islands, so as to afford safe and convenient navigation. The improvement of the Lake St. Francis section requires only the dredging of deep channels through shoals in the lake. Neither of these two sections offers any engineering com-

plications. The engineering aspects of the proposal lie in the improvement of the three rapid sections—the International, the Soulange and the Lachine.

There are two general methods for carrying navigation past each of these sections. One is to construct a lateral canal, with locks, and the other is to convert the rapids into a navigable reach by the construction of a dam or dams with locks and short canals to carry navigation past the dams.

The enlargement of the existing 14-foot lateral canals may be summarily dismissed. These canals are so laid out as to require some 25 lockages in the transit between Lake Ontario and Montreal. The delay incident to such a number of lockages in an improved canal is inadmissable. Moreover, the existing canals carry an important traffic and must be kept in operation until a new waterway is opened. Their enlargement under traffic would be most difficult and expensive, if not impossible.

A new lateral canal requires, on the St. Lawrence, a less expenditure of funds than the construction of a dam in the river, but it affords a link in the navigation route through which vessels must move at slow speed, one which is subject to blockage should a vessel ground in the canal, and a route which cannot be enlarged readily to meet growing demands of traffic. The pool formed by a dam will afford open and unrestricted navigation, decidedly superior to that afforded by a canal. The concentrated fall at the dam will afford the means for developing power from the flow of the river, the value of which is an offset to the increased cost of pool navigation.

POWER DEVELOPMENT AND IMPROVEMENT OF NAVIGATION

While, therefore, the plans presented by the Joint Board of Engineers were prepared in accordance with the recognized principle that the interests of navigation on the St. Lawrence are paramount, yet the board found that the full observance of this principle does not interfere with the beneficial use of the flow of the river for power. On the contrary, the improvement of the rapid sections of the river for the joint benefit of navigation and power was found to afford, as a rule, much better navigation than could be secured by the improvement now economically justifiable in the interest of navigation alone.

The extent to which the development of power can be advantageously combined with the improvement of the river for navigation depends primarily on the rate at which power can be marketed. This is an economic question on which views may diverge quite widely. It is complicated by the economic policy entertained in Canada of restricting the export of power in order to stimulate the development of industries within her borders. The plans presented by the Joint Board provide for an initial power development in conjunction with navigation improvement which is based on conservative estimates of the rate at which power can be marketed under restrictions as to exportation. They provide however, for the eventual utilization of the complete power resources of the river.

A controlling limitation on the installation and operation of power plants on the St. Lawrence lies in the fact that any sensible hourly fluctuation in the volume of flow past Montreal is inadmissible from the standpoint of navigation in that port and in the channel from Montreal to the sea. Montreal is not a tidal port. The extreme low-water elevation of the water surface in the harbor is some 18 feet above sea level. The depths in the harbor are dependent upon the

slope of the river between Montreal and Quebec, where the river finally reaches sea level. This slope is in turn dependent upon the volume of the discharge of the St. Lawrence and of the Ottawa, which join near Montreal. A fluctuation of 10 per cent in the discharge of the St. Lawrence produces a change of about one foot in the water level of Montreal Harbor. The depths in the harbor and in the channel to the sea have been won by the expenditure of large sums for dredging, and no diminution in depth through the operation of up-river power plants would be tolerated. These plants cannot be designed and operated to secure the maximum use of water by fluctuating the hourly flow to meet the fluctuating power demand.

POWER PLANTS AND WINTER DISCHARGE CAPACITY

The design and construction of hydro-electric machinery has reached such a stage that the design of power plants to develop the large quantities of power available in the St. Lawrence offers no new problems. The power plants must, however, operate both winter and summer if the power is to have any economic value, and the winter operation affords an unusual problem on the St. Lawrence. The critical feature is the maintenance of the winter discharge capacity of the river without excessive loss of head from ice gorging.

The rapid sections of the river now run open during the winter, for the currents are so swift that an ice sheet cannot form over them. From the time that the water in the river reaches the freezing point, in late December or early January, until the end of the winter, these exposed reaches are steadily making ice in the form of frazil and anchor ice. Frazil ice forms as minute crystals in the water, anchor ice as loose masses on the bed of the river, due to the loss of heat by radiation. The particles of frazil agglomerate in pans of soft, snow-like ice which float down the surface of the river; and the anchor ice when loosened by the heat of the sun rises to the surface and floats down in similar masses.

In the quiet water at the foot of each rapid section an ice cover forms early in the winter. The oncoming masses of slush ice pack against this until the sheet has progressed into currents so rapid that the slush is carried under the ice sheet, creating a hanging dam which gorges the river. The gorging causes a rise in the river surface which eventually permits the pack to extend upstream. The ice accumulations at the foot of the rapid reaches extend for miles at the end of winter, and raise the water level by from 10 to 30 feet.

In the present condition of the river, the ice packs at the foot of the rapid reaches never push their way so far upstream as to back up the water at the head of the reach. There is a free discharge at the head of each reach, and the flow down the river suffers only the minor retardation due to minor local ice obstruction.

The construction of a dam in any of the rapid reaches of the river will, in the general case, convert the downstream portion of the reach into a deep, slow-flowing pool, certain to freeze over early in the winter. The upper portion of the reach will necessarily remain open, because the water levels at the head of each of the three rapid sections cannot be raised sufficiently to prevent this condition without creating excessive flood damage. Any substantial raising of the water level at the head of the International Rapids section would flood out the cities on Lake Ontario; a raise of the water at the head of the Soulanges section would flood wide areas of the low-lying land

that borders Lake St. Francis; and a substantial raise at the head of the Lachine section would flood the suburbs of Montreal.

ENLARGING CHANNEL TO PREVENT GORGES

The situation to be met when a dam is built in the St. Lawrence is, therefore, the prevention of an ice gorge at the head of the frozen pool formed by the dam. It can be met by enlarging the river channel in the upper portion of the rapid section until the currents are reduced to so low a velocity that the oncoming slush ice formed in the part of the river which remains open will not be carried under the ice sheet, but will consolidate on the surface, extending the sheet upstream. The plans for power development prepared by the Joint Board of Engineers are based on enlarging the upper reaches of the rapid section by excavation where necessary to ensure, with the discharges that must be maintained in winter, current velocities so low as to effect this condition, except through short distances at the extreme upper end of the reach, where the remaining area of open water could not produce enough ice to be of consequence.

The excavation required to accomplish this result runs into large figures. The wide and deep channels necessary for the purpose will afford superior navigation, and will reduce the river slopes to a minimum, affording a maximum concentration of fall for power production. Their cost can, however, be justified only by considerations of winter power operation.

It may be observed that the condition described is due to the great volume of winter flow of the St. Lawrence as compared with the capacity of its natural channels. On the ordinary northern river the rise required to adjust the slopes to its winter regimen is small in comparison with the rise during the spring floods, and does not have to be reckoned with in the development of power on the stream.

OTHER METHODS OF PREVENTING GORGES

Two other methods have been advanced for meeting the peculiar winter situation on the St. Lawrence. One of these is to build the dams at so low a height that the ponds will not freeze over. If, however, the water is raised by the dams sufficiently to make the river navigable for deep draft shipping, and to concentrate the fall for power development, the currents are necessarily reduced to a range sufficiently low to permit of the formation of an ice bridge across the stream under extreme weather conditions, but sufficiently high to convert this bridge into a hanging dam as soon as it has formed. The danger of the formation of an ice jam would always be present, and the consequences of its formation would be serious. Moreover, with the entire reach running open, the ice accumulating at the foot of the reach, as at present, would greatly reduce the head and the available power in winter.

A view has unfortunately gained wide credence that the formation of frazil ice is due to the agitation of the water in the rapids, and that if the river surface is raised sufficiently to produce a smooth flow, the amount of frazil will be greatly reduced, even if the river remain open in winter. It is an elementary principle of physics that the amount of ice formed is proportional to the amount of heat lost, and extensive measurements made by the Joint Board establish the fact that the winter heat losses from smooth flowing portions of the river are at substantially the same rate as from the portions broken by rapids.

An ice sheet over a ponded portion of

the river creates an insulating blanket which reduces the heat loss to a small figure; and the ice produced by this residual merely adds slightly to the thickness of the insulating blanket. Since there is no marked spring rise on the upper St. Lawrence, the spring break up of the ice sheet will occur quietly and will not give rise to the jams found on rivers in which the breakup is accompanied by a freshet discharge.

The studies made by the Joint Board show conclusively that the problem of winter power operation on the St. Lawrence can be best met by works designed to create an ice cover over the river.

A second method that has been proposed for meeting the peculiar winter conditions on the St. Lawrence is to construct the power dam to such height as will utilize a part only of the full available fall in the reach, reserving the remaining available fall, by means of a control structure at the head of the reach, to overcome the retardation created by winter gorging. An inherent difficulty with such a proposal is that it aggravates the condition that it is intended to remedy, because with the pool at a lower level, the length of the swifter running open river will necessarily be increased. Unless an ample margin of head is reserved, severe weather conditions might lead to its exhaustion before the end of winter. Works designed on this principle do not conserve the full value of the natural power resources of the river, and the cost of the control works is not substantially less than the cost of the channel enlargement designed to prevent the condition that the control works are intended to remedy.

The plans proposed by the Joint Board of Engineers are based on the foregoing considerations of the general problems involved.

PLANS FOR THE INTERNATIONAL RAPIDS SECTION

In the International Rapids section, extending 48 miles along the international border, the river has a total fall of 92 feet, a large part of which is concentrated in the Long Sault Rapids, near the foot of the reach. In this section the ponding of the river by a dam or dams, for the joint benefit of navigation and power, unquestionably affords the best method of development. The length of the section is such that a side canal for navigation would be extremely costly and would impose an unnecessary hindrance to shipping. A market exists in the United States for the prompt absorption of all the power attributed to it from the development. While the market for power in the Province of Ontario is less extensive, there is a present demand for at least some of the power that would be generated.

Two plans for improvement were prepared by the Board, both of which were designed to open this portion of the river to deep-draft navigation, to assure the fullest practicable utilization of the power resources of the river, and to secure dependable winter power operation. One of these plans proposed to convert the entire section into a single navigable pool by means of a single high dam and power houses, to be constructed at the foot of the reach, at Barnhart Island. This is designated the single-stage development. The second plan was for a two-stage development through the creation of an upper and a lower pool, the upper pool being formed by a dam and power house about midway through the reach, at Ogden Island, and the lower pool by a dam and power houses at Barnhart Island that would have 18 feet less height than in the single-stage development.

With the single-stage development, navigation would enter the pool through a free channel from the upper river, and would pass from the lower end of the pool through a short canal on the American shore, with two locks, into a channel leading to Lake St. Francis. With the two-stage development navigation would similarly enter the upper pool through a free channel, pass from the upper to the lower pool through a lock at the Ogden Island Dam, and from the lower pool through a canal with two locks to Lake St. Francis as in the single-stage plan. The two-stage development would therefore require one more lock than the single stage.

The computed head at the power houses in the single-stage development is 85 feet. It is expected that the increased resistance of the ice-covered pool, and of ice obstruction in the tail races, will reduce the head to about 75 feet in winter. The power houses are to be built to provide for the eventual installation of hydro-electric generating machinery with a capacity of 2,326,000 horsepower. This will utilize the mean discharge of the river.

With the two-stage plan the computed head at the upper power house at Ogden Island is 17 feet in summer and 12 feet in winter, at the lower power houses 67 feet in summer and 63 feet in winter. They are to be constructed for the eventual installation of 406,400 horsepower at the upper power house and 1,808,600 at the lower, a total of 2,215,000 horsepower.

The plans for the single-stage development include the provision of controlling gates at the head of the reach at Galop Island with a free navigable pass 450 feet in width. These gates will normally remain open.

The amount of channel enlargement required to assure satisfactory winter operation cannot be predicted in advance with certainty. It is proposed to execute initially only such enlargement as is necessary to insure satisfactory navigation conditions and to prosecute this enlargement after the pool has been created, when dredging can be done more advantageously, until satisfactory winter operation is secured. The control of the head through the section afforded by the control gates at the Galop will afford a means for insuring the winter discharge capacity of the river during this period.

The estimated cost of the single-stage development, including the eventual enlargement of the channels to the extent foreseen as necessary to assure winter operation, and the eventual installation of hydroelectric generating machinery to the full power-house capacity is $235,000,000. This includes compensation for 22,000 acres of land that would be inundated by the execution of the project and for all damages related thereto. The estimated cost of the two-stage development, similarly complete, is $264,500,000. The area inundated would be 12,000 acres.

The United States Section of the Joint Board recommended the single-stage development as affording better navigation through the elimination of one lock, and slightly more power, at a cost of $29,600,000 less than the cost of a two-stage development.

The Canadian Section of the board recommended the two-stage development on the ground that it can be carried out in two parts, so that power from the upper development can be developed and marketed before the whole of the project is completed. It believed that for this reason the overall cost, including interest charges, will not be as greatly in excess of the single-stage development as appears from the comparative costs without interest charges. It believed that

control over the flow of the river would be better assured. Flowage of land would be reduced as has been indicated.

Studies made by the Canadian Section subsequent to the submission of the report have lead it to prefer a two-stage project with the upper dam about 7 miles farther downstream, at Crysler Island. The lower pool would be at an elevation 7 feet below that proposed in the former project, affording a much more favorable head at the upper power house. The estimated cost of this modified two-stage project is $269,355,000, or about $5,000,000 in excess of the project with the upper dam at Ogden Island, and flooding damages are somewhat increased. The number of locks remains the same. Its advantage lies in the better power operating conditions afforded by the increased head at the power house of the upper dam.

It may be observed that the construction of both dams of the two-stage development, with connected powerhouse substructures, is necessary before navigation can be opened through the reach.

In this section the paramount interest of navigation is overshadowed by the large expenditures required for power development. The cost of the locks and their approaches and other works requisite only for navigation is but about $25,000,000 with the single-stage development, or about $33,000,000 with the two-stage. The remaining sums are required for power development whether or not navigation is provided. It is to be anticipated, therefore, that the arrangements made for financing the power development will determine the choice of the plan eventually selected.

THE SOULANGES SECTION

In the Soulanges section, extending 18 miles from Lake St. Francis to Lake St. Louis, there is a total fall of about 83 feet. At the Cedars Rapids, midway in the section, an existing and quite modern power plant diverts about one-third of the river flow and develops power with about 32-foot head.

While the probable lack of market indicates that the immediate complete development of the power in this section in conjunction with navigation improvements would not be economically justifiable, the Joint Board of Engineers found it to be practicable and advantageous to combine the improvement for navigation with the development of power on a progressive program of construction of power plants, only the first part of the power development being undertaken in conjunction with the works required to carry navigation through the section.

This plan provides for the construction of a dam and power houses at the head of the Cedar Rapids, which would create a navigable pool in the upper part of the section, and would afford a head of 22 feet. Navigation would enter this pool from Lake St. Francis through a canal, 3 miles in length with one low lift lock, and would pass from the pool to Lake St. Louis through a second canal, 5 miles in length, with two lift locks.

The estimated cost of this initial development, including the development of 382,000 horsepower at the power houses, is $104,000,000. The eventual development of the remaining available power, in part by a head-race canal to the escarpment at Lake St. Louis and in part by a second dam and power house at the foot of the section, is $101,000,000. The total installed hydroelectric generating machinery in the eventual complete development would have a capacity of about 2,000,000 horsepower.

A comprehensive scheme for the

immediate development of the entire power resources of the river, and the utilization of the entire river course for navigation, by the construction of two dams which would convert the river into two navigable pools, was found to cost $10,000,000 less than the eventual cost of the successive power development with the plans recommended. It was regarded as meriting serious consideration if a market for the large amount of power can be found within a reasonable period.

The Joint Board of Engineers united in the view that the plan first outlined better provides for the present and future development of the waterway than any scheme for navigation alone, and is therefore the desirable plan, if arrangements are made whereby power interests bear a fair proportion of the initial expenditure required.

If it be found impossible to arrange for such coöperation in meeting the initial cost, a majority of the Canadian Section of the Board favored the construction of a lateral canal for navigation on the south side of the river, at an estimated cost of $33,640,000. It would be about 15 miles in length from shore to shore. A canal can be built in this location at the least cost, but no part of the canal can be subsequently incorporated in a development of the river channels for navigation. The United States Section submitted the view that a route designed to serve so large a territory will demand eventually the freer navigation of the open river. It believed, therefore, that even if arrangements cannot be made for the participation of power development in the initial development, it would be better to proceed on the plans laid out for this development, limiting the construction of the power houses to the substructures. The cost, when so curtailed, would be $78,515,000. As an alternative the United States Section suggested a canal on the north side of the river, at a cost of $40,378,000, most of which could be utilized in connection with a subsequent development of the river channel.

PLANS FOR THE LACHINE SECTION

The remaining section for consideration is the Lachine section, which includes Lake St. Louis and the 10 miles of rapids, swift water and shoals between that lake and Montreal Harbor. In this section, the first 11 miles through Lake St. Louis are in deep water, the remaining 4 miles are through the shoal water at its foot. The total fall through the section is 48 feet, of which 24 feet is the fall through the Lachine Rapids.

The winter rise in and above Montreal Harbor, due to the accumulation of ice, reduces the total fall to about 30 feet.

The Joint Board of Engineers found that in this section it was not feasible to utilize any part river channel below Lake St. Louis for navigation without an excessive amount of costly excavation, on account of the high current velocities in this contracted section of the river even when raised to its highest practicable level. It found, therefore, that a side canal affords the most suitable route for navigation between Lake St. Louis and Montreal Harbor.

The route selected for the side canal follows close to the river bank in order that it will not interfere with the future growth of the city of Montreal and will not introduce the difficult problem inherent to the crossing of land and water traffic, with the consequent inconvenience and delay to both. It has three lift locks and a guard gate.

The city of Montreal lies on an island at the confluence of the St. Lawrence and the Ottawa. A part of the discharge of the Ottawa is delivered into

Lake St. Louis above the city, and a part flows north of the city, joining the St. Lawrence at the foot of the island on which the city lies. On account of the widely varying flow of the Ottawa, there is a range of about 8 feet in the levels of Lake St. Louis. In order to reduce the excavation of the upper level of the navigation canal and of the channel required through the long shoal at the foot of the lake, the plans include the construction of a control dam in the river below the lake, by which the levels of the lake can be held up during the navigation season. Flood discharges will be passed through the dam. The plans provide for a dam of the rolling shutter type, which will be entirely opened in winter, so that the winter regimen of the river will not be changed. Supplemental control works are required in the other outlets of the Ottawa to preserve the present proportional flow past Montreal during the low-water season. The cost of the entire system of control works is about $2,000,000 in excess of the saving in excavation costs which they effect, but these works will reduce the cost of any future development of power at the Lachine Rapids, besides being of benefit to local navigation on the lake. The entire cost of the improvements proposed in this section is $53,000,000. They are coördinated with the future development of the full power resources of the section.

The plans that have been described for the improvement of the various sections of the river provide for channels which can eventually be enlarged to a depth of 30 feet, the lock sills and other fixed structures being designed for that depth. The estimates that have been given are for an initial excavation of the channels to a minimum depth of 25 feet, which will be suitable for navigation by vessels not exceeding 23 feet salt-water draft. The total estimated cost of the entire improvement of the St. Lawrence between Lake Ontario and Montreal, including the installation of hydroelectric power generating machinery to the full capacity of the power houses of the power developments initially proposed, with the channels initially excavated to a depth of 25 feet, is from approximately $394,000,000 to $428,000,000 depending upon the form of improvement adopted in the International Rapids section. This includes the cost of power works with an installed capacity of from 2,730,000 horsepower to 2,619,000 horsepower, the value of which can be conservatively placed at between $250,000,000 and $300,000,000.

The added cost of providing initially channels 27 feet in depth is estimated at $5,800,000. The reduction in cost if channels 23 feet in depth are initially provided is estimated at $5,300,000. It may be observed that the broad economic question of the depth that should be provided initially rests on the cost of the requisite deepening of the interconnecting channels and the harbors on the Great Lakes to derive the benefit from the waterway.

It is to be borne in mind that the draft of a vessel must be less than the channel depths. Channels 23 feet in depth are suitable for the navigation of vessels not to exceed 21 feet salt-water draft; channels of 25 feet depth for vessels not exceeding 23 feet salt-water draft, and channels 27 feet depth for vessels of 25 feet salt-water draft. For vessels of the size of those that would use the proposed St. Lawrence Waterway, the fresh-water draft exceeds the salt-water draft by from 6 to 7 inches.

The plans which have been described provide for a navigation route from Lake Ontario to Montreal Harbor with a total not to exceed 25 miles of restricted canal navigation and with

What the St. Lawrence Waterway Means to the United States

By W. L. HARDING
President, Great Lakes-St. Lawrence Tidewater Association

THE demand throughout the west for a ship channel outlet from the Great Lakes to the Atlantic Ocean, by way of the St. Lawrence, rests upon the need of that region for more direct and cheaper connection with the markets of the world, and also upon the physical make-up of the North American continent, which lends itself, by reason of the location, depth, and breadth of the Great Lakes and St. Lawrence River, to such a connection —a connection that would give to the North American continent, a fourth ocean, its shores reaching to the borders of the harvest fields of the Middle West, now removed a thousand miles and more from contact with the sea.

On no other continent has civilization entrenched itself at any considerable distance from the ocean. On this continent alone it has done so under conditions that do not assure its continuance, unless the transportation handicap that distance from the sea always and everywhere involves be removed.

The North American mid-continent was claimed for civilization under peculiar conditions. The movement from the Atlantic over the mountains and into the plains beyond began before the days of the steamboat or of the railroad, and when the tools of industry and agriculture were for the most part as crude as they were in the days of Caesar. Not even the plow was yet an efficient tool, and the grain drill, the binder, the threshing machine were all unknown. The agriculture of western European lands was settled in its ways, and that of our now great competitors—Argentina, Australia, Russia —was not a factor in world trade—in fact, did not cast a shadow over the future.

We invented the steamboat, we adapted the railroad, we improved the plow, we invented the reaper, the grain drill, the threshing machine and the modern binder, and we developed, ahead of any other nation, all of these things and put them to our purpose of subduing a continent.

By the most ingenious system of bonuses ever known to history, we invited the pioneers of three generations to put the lands of the interior under cultivation—lands that, for the larger part were level, treeless and rich and that made our quick results of large acreage under the plow and large production possible.

We financed our wars out of these lands. We held out to our farmers as a reward for their labor, not a fair return in cash for the crops harvested, but an increasing equity in the lands themselves, as the country might settle up and the value of the lands might increase.

The network of our railroads spread over the interior and on to the Pacific. The iron ores of Minnesota, the copper of Michigan and of Montana, the output of the smelters in the Rockies was added to the golden harvest of the farmers. The inland ocean of the Great Lakes became busy with a water-borne commerce that told of the rising greatness of Buffalo, Toledo, Cleveland, Detroit, Milwaukee, Du-

luth-Superior, Chicago and other thriving harbors.

The great cities of the prairies were called into being. The packing business moved westward from Cincinnati, and the day of the open ranges began. The prairie states of the Middle West settled into their agricultural stride.

Then our factories carried the plow, the binder, the thresher to other and new lands, agriculturally speaking—to the Argentine, to Australia, to Russia—all lying close to the sea, all able to ship from the farm to the market in Europe for less money than we can possibly hope to—unless a way can be found to move our farm lands closer to the ocean.

Our three great advantages—lands cheaply acquired, easily tilled, and stored with a wealth of bankable fertility—made possible the civilization that is now ours in the Middle West; these, coupled with the fact that we had no large or active competition in the market places of the world.

We now have that competition. It is here to stay. It will increase, rather than diminish, with the passing of time. New areas, outside of this continent, and fit for agriculture, will develop and become competitors of ours, with whom we must in all the future years do a competitive business.

For the major portion of the things the Middle West produces, the world's market place is Europe. Europe is where the consumers are—Western Europe, the Baltic, the Mediterranean. The people of the Atlantic Coast cities are fed in good part by the farmers of the east—by the farmers westward to the Mississippi. And the farmers of the trans-Mississippi region are thrown back upon the European market with their surplus—with the surplus which we as a nation need to continue and will continue to produce in order that at all times we may have plenty for ourselves.

EXCEEDS DOMESTIC NEEDS

The transportation-handicapped region of the United States is neither small in producing power nor is its production going to cease. This region possesses 63 per cent of the dairy cows, 55 per cent of other cattle, 75 per cent of the hogs, 76 per cent of the sheep, 61 per cent of the horses and 63 per cent of the total live stock value of the United States, as estimated by the United States Department of Agriculture. Of the edible crops—that is, excluding flax, tobacco and cotton—the transportation marooned area produces approximately 60 per cent. And except for the South, when the area of farm acreage expansion is considerable, the marooned area under discussion holds the reserve high grade agricultural lands of the nation.

Taking the national resources that are non-agricultural, the transportation-locked area leads in hydro-electric power with approximately 50 per cent of the potential supply of the United States. This region contains our future supply of coal and of petroleum; here are our copper and lead and iron supplies both of today and for the years to come. These unused and tangible resources point to expansion in the future, conditioned only upon the access of the Middle West to the markets of the world on an even footing.

The point, without being too dry-as-dust statistical, is that the transportation-handicapped area within the United States is producing now, and can and will expand its production in the future well beyond any present or near future home consumption requirements.

CONTINUING INTERNATIONAL TRADE

According to the United States official figures for 1922, the average per

capita wealth of the marooned area is $3553. The average per capita wealth of the entire United States was, for that year, $2918. This can mean nothing else than that, both in producing and consuming power, the area in question, with its 45,000,000 people, carries its share of the load of foreign commerce, both going and coming. That commerce amounted, in 1924, in goods sent and received overseas, to 80,514,000 long tons, of which the marooned area's equitable portion, produced or consumed, would be 40 per cent, or 32,000,000 tons.

That, however, is not the yardstick by which to measure the need of the American interior for better transportation. That estimate is arrived at by detailed studies of all lines of production. It is worth while to consider whether any people engaged in the wholesale production of crude and bulky materials such as grain, foods, ores and the like will ever cease very largely to produce those things, or other things comparable in tonnage.

For example, contrary to popular opinion, the percentage and the volume of wheat exports from the United States have not decreased with the passing years. From 1866 forward the largest per cent of any wheat crop shipped abroad was during the period 1876–1906, during which time we exported an annual average of 30 per cent of our crop. In 1922 we exported 25.6 per cent; in 1923 we shipped out 19.9 per cent and in 1924 our shipments reached 28.8 per cent. The bushel figures are even more striking, showing that right now, in these post war years, the American farmer is maintaining his production and his exports of wheat well above the levels of the pre-war years. Today the wheat acreage of the nation is again expanding. And if the farmer of a coming generation chooses to abandon wheat it will be in order that he may produce other bulky foods, that, like wheat, create tonnage and invite tonnage in return. And it will be for the obvious reason that the production of these other things will be more profitable to him, and will make of him a more important trade-load factor. As an example the farmer has ceased to export flax. What is the result? The nation imports flax—ships it inland to the linseed mills situated on Lake Erie and at Minneapolis. Little, if any, tonnage of flax movement has been lost, and the erstwhile flax farmer is growing other tonnage and making crops more profitable. The result is a net gain in tonnage. The idea of a vanishing export tonnage from the interior and to the interior of the continent is a myth.

ENHANCES NATIONAL ECONOMY

Of the 80,000,000 long tons comprising the total 1924 overseas commerce of the United States 43,000,000 moved out of or into the ports of the North Atlantic, 23,000,000 by way of the Gulf of Mexico, 12,000,000 out of and into our Pacific harbors, and the balance from the South Atlantic ports. In addition to this there was a Great Lakes total movement to and from Canada amounting to 15,500,000 tons. These figures will indicate, to some extent at least, the general directions taken by our commerce in seeking outlet to the sea. They parallel the rail and water movements throughout the country, and they cast a side light upon the fact, already mentioned, that Europe is by far our largest customer, especially for those products that are essentially mid-western in origin, such as grain, food products, and the fabricated products of iron, copper, etc.

The transportation handicap which this interior commerce is under when moving into world trade is measurable.

The difference between the existing rate by rail to the Great Lakes, thence by water to Buffalo, by rail from Buffalo to New York, and from New York by ship to Liverpool, and a fair transportation charge for same cargo moving by rail to the Great Lakes and by water direct to Liverpool is set, by Alfred H. Ritter, Transportation Specialist of the War Department at a minimum of $4.00 per ton in favor of the St. Lawrence route, assuming that ships of ocean draft could ascend into the upper Great Lakes with, and for cargo.

The report of the President's Advisory Committee, the St. Lawrence Commission of the United States of which the Hon. Herbert Hoover is chairman, estimates that at present there is available for movement over this waterway 23,000,000 tons of cargo. This Commission states that,

> It has been estimated that the values in a single year to the farmers alone would equal the capital cost ($123,500,000) of the waterway.

But in considering the question of possible tonnage a larger aspect of the problem should not be forgotten. A major transportation route not only fixes the rates chargeable by secondary routes, but it also fixes basic price levels throughout the area of its influence. Today the price of wheat in the mid-continent of North America is determined by the world market price, *less* the cost of transportation. Cut the transportation charge and you do not benefit the buyer. His requirements and market supply remain as before—the saving reflects back to the shipper, and the farm price levels advance on *all* wheat sold, both for local consumption and for export.

An illustration may serve to make this point clear.

A farmer sells grain to a local miller. The price he receives will be based on the local price for grain, which in turn is based on Liverpool, minus the total freight, from his station to that terminal market. It is obvious that, in this instance, the farmer, whose grain is ground into flour at the local mill, *actually pays freight on his wheat to Liverpool.* And whatever lowering of the freight rate may be obtained by opening the Great Lakes to Ocean commerce, will benefit that farmer to the same extent as it will benefit the man whose wheat crosses the ocean.

This principle of local price control through the establishment of low cost transportation to the ultimate market holds true for barley and for corn and lard, and for bacon and for lumber and copper and wooden ware and steel safes and machinery and clothing, for automobiles and for all the multitude of things produced or used by and in the mid-region. Today the Great Lakes-Ocean trunk line that runs via Buffalo and New York sets the price levels. Open a wider, better path—an adequate path—and every business, and not the farmer alone, must and will benefit thereby.

The foregoing estimates of tonnage and of saving thereon, using Alfred H. Ritter's figures, indicate an annual direct overcharge on actual movement out of and into the freight-handicapped mid-region amounting annually to $120,000,000. Nor does this take into account the unseen charge, by way of depressed price levels, on things produced but not exported. One hundred and twenty million dollars is interest, at 4 per cent, on $3,000,000,000. This figure is arrived at merely as suggesting that a reasonable expenditure of public money so used so to turn this capital value into productive channels may be justified on broad grounds of national economy.

By their official action twenty-two

states have severally and jointly approved the opening of the St. Lawrence barriers between the Great Lakes and the Atlantic. These states comprise what is known as the Great Lakes-St. Lawrence Tidewater Association. It should be clearly understood that the purpose of these states is not to reach any one point on the Atlantic, but rather to reach the ocean itself. They are not looking for a way to New York, only as and insofar as New York is one of the port cities of the world. The marooned interior comprising these states is looking for a trade road to *all* the world—not for a detour, nor for a half-way depot. It seeks a trunk line out of the Great Lakes and onto the high seas. Once there it can steer its course to the most desirable market.

A glance at a globe of the world will make clear the reasons for this determination. From the dawn of history until today, sea routes have controlled the world's trade. They still do. They always will. The reason is simple. Water transportation is far cheaper than transportation by land. Today, steamship against freight car, the cost is about one to ten. The cost of one mile of land transportation buys ten miles of ocean transportation.

And within the memory of men we have remade the map of the world. We have cut the isthmus of Suez and brought India, China, Japan, Australia the eastern coast of Africa thousands of sea miles closer than ever before to the doorstep of our principal buyer—Europe. We have cut the isthmus of Panama and once more we have floated the continents closer together. By building the Panama Canal we have put Calgary and Seattle closer to Europe by way of the Pacific and the Caribbean than they are by way of the direct rising sun and Atlantic road. And of still deeper, more direct and vital concern to the interior of this continent, the building of the Panama performed the miracle of bringing San Francisco and New York—the Pacific coast and the Atlantic—closer to each other than either city or either coast is to any inland point five hundred miles removed from the ocean. This has landlocked the interior of the North American continent. While our seacoasts move forward under the stimulus of lowered sea rates and active participation in world trade, the interior finds its transportation rates to and from the sea advanced, its competitors in other lands able, by reason of short land haul, to meet world conditions and prices that deny to the mid-section of North America its place in the world's markets—unless we finish the job of world rebuilding along lines obviously pointed out to us by nature.

The world is round. The eastern coast of the United States points not toward the North Pole, but toward Europe. So do the Great Lakes and St. Lawrence River. For two thousand miles this natural highway parallels the Atlantic coast. The Great Lakes, carrying a commerce equal to more than one-fourth the ton mileage of all the railroads within the United States, are open to ships of ordinary ocean draft and tonnage from Duluth and Chicago to Buffalo. Their channels are wide, their harbors ample, they are, in fact, an ocean extending a thousand miles along our northern border, linking the coal fields and the iron mines, linking the corn belt and the grain fields with the industrial East. Across the Niagara isthmus, the Welland Ship Canal is nearly ready to take the largest Great Lakes ships and let them down into Lake Ontario, where from the foot of the Welland Ship Canal, now nearing completion, to Ogdensburg on the St. Lawrence is deep water. From Montreal, the second largest port of the Atlantic

seaboard, to Liverpool and to all western and southern Europe the sea lanes are wide open. Five thousand miles of sea channel extend from Duluth and Chicago to Liverpool and points beyond, and all accounted for as deep, wide, free navigation adapted to ocean-going shipping, except twenty-five miles. That is the picture the ship captains see. That is the picture the Joint Board of Army Engineers of two nations paints for us. That is what the mid-continent has to start with when it demands a sea-road to Europe.

The engineering problems involved do not properly belong to this discussion. It may suffice to say that, not without thought, not without full examination into any and all routes, and with a complete knowledge of what the engineers of both nations had already done, was the choice of the marooned interior fixed upon the St. Lawrence as the only practical route to the sea.

Not only was the fact that the St. Lawrence route is a "going concern" taken into account, but also the fact that the numerous surveys of that route and other routes plainly indicated its preferability to the continental interior for the purpose of establishing an unrestricted thoroughfare to the world bordering upon the high seas. The Associated States rest their case as to the engineering feasibility of the route chosen upon the decision of the Joint American-Canadian Board of Engineers, in two reports.

The basic engineering facts are well known. Time required, lift, restriction of traffic, cost—all these things more closely computed by the Joint Board of Canadian and American Engineers that surveyed the St. Lawrence route in 1920–21, and again in 1925–26.

There is no alternative route. There is no other sea road to and from the industrial and agricultural empire westward of the Appalachians. Rivers that carry us to the sea, canals that climb the hills—these may serve a useful purpose in the quickening of our transportation circulation, but they are, at their ultimate best, but highways leading down to the ocean. And when one takes to a highway he will, if he is wise, choose one that leads toward his destination. The Great Lakes are in themselves an ocean. The St. Lawrence is a strait. Across the seas that send their tides a thousand miles up its broad bosom is the great market place of the world. There the mid-continent buys and there the mid-continent sells, and between Duluth and Liverpool, between Chicago and the Baltic, between Detroit, and Marseilles lie today two great barriers—one of rock, that can be measured, drilled, blasted until the waters run deep and free, until the ships can go out and in.

The other barrier is that of misunderstanding as to need and purpose. And it, too, bearing in mind the history of this America of ours, is removable.

The Economic and National Significance of Connecting the Great Lakes with the Sea by the St. Lawrence Route

By Hon. I. L. Lenroot
United States Senator, Wisconsin

I HAVE been asked to discuss the economic and national significance of connecting the Great Lakes with the sea, by the St. Lawrence route.

Speaking first of its national significance, it is demanded by 40,000,000 of our people in the West, more than one-third of our population, because of the economic benefits that will result in bringing the Atlantic Ocean to the heart of the continent, and making ocean ports of all of our cities upon the Great Lakes. It is also demanded by a large majority of the people of our New England States because of transportation benefits and the cheap power that will be developed for their use, which will remove one of the most serious handicaps to the continued existence of their industries.

The history of the idea of connecting the Great Lakes with the sea is most interesting. It has been a dream of many years, almost since the Republic was founded, and its history is not so dissimilar to the history of the Panama Canal. It may not be generally known that the first project for connecting the Great Lakes with the sea was inaugurated by George Washington. In 1792 he obtained the passage of an Act of Incorporation by the Legislature of the State of New York for the construction of a waterway between the Hudson River and Lake Erie by a system of canals and slack water and lake navigation by way of the Mohawk River, Oneida Lake and River, and Oswego Lake and Ontario. Of course, Washington little dreamed of the leviathans of the deep that we have in our day. As we all know, canals have been constructed. We have today the Erie Canal, but it does not permit the passage of ocean-going vessels into the Lakes, and although the State of New York has expended more than $200,000,000 upon this project, it has proved to be a colossal failure, and Government boards, one after another, engineering and otherwise, have reported that it is not practical, except at a prohibitive cost, to construct a canal between the Great Lakes and the Hudson River, that will admit ocean-going vessels to the Lakes.

Twenty-two states have joined in an association, known as the Great Lakes-St. Lawrence Tidewater Association, to promote the St. Lawrence route, the governors of each being *ex-officio* a member of the Council of States directing the activities of the Association. The mere recital of the names of the states indicates the national character of the organization. They are Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Colorado, Wyoming, Montana, Idaho, Utah, Washington, Oregon, South Carolina, West Virginia, and Kentucky. Its Executive Director is Charles P. Craig, of Duluth, with headquarters at Washington.

The International Joint Commission, a permanent official body consisting of three persons appointed by

the President of the United States, and three persons appointed by the Government of the Dominion of Canada, in 1922 made a report upon this subject unanimously recommending the St. Lawrence route. They said:

The conclusion is obvious that if countries that had for the most part to import their raw materials from abroad were able to build up a great foreign trade because of their ready access to the sea, the region economically tributary to the Great Lakes, with its limitless resources, its raw materials within easy reach, its facilities for industrial expansion, can hardly fail to become an even greater factor in the world's markets than it is today, if given a practical and efficient water route to the sea.

On March 14, 1924, President Coolidge appointed a commission with Hon. Herbert Hoover, Secretary of Commerce, as chairman, to make a further study of the subject. On December 27, 1926, it made its report unanimously recommending the St. Lawrence route. I quote from its report:

The construction of a shipway of sufficient depth to admit ocean-going shipping from the Atlantic to the Great Lakes will lessen the economic handicaps of adverse transportation costs of a vast area in the interior of the continent. Within the United States it embraces all or large portions of the states of Ohio, Indiana, Kentucky, Illinois, Iowa, Missouri, Kansas, Nebraska, North and South Dakota, Montana, Wisconsin, Minnesota, Michigan, Pennsylvania and New York. It includes a large part of Canada. Within this area there are more than 40,000,000 inhabitants who gain their livelihood from its basic industries. It produces a vast surplus both from agriculture and manufactures, much of which demands long transportation. . . . It has been estimated that the values in a single year to the farmers alone would equal the capital cost of the waterway. . . .

The interior states which are affected by this situation have not been neglectful of the benefits to be derived by the bringing to them of ship transportation to the sea. Eighteen of them have associated together by acts of their legislatures, under the name of the Great Lakes-St. Lawrence Tidewater Association. They represent nearly two-fifths of our population. They have made their own independent investigation and have concluded and declared that the opening of the Great Lakes to ocean-going vessels through the St. Lawrence is a major public necessity in the economic interest of their communities.

The Commission further stated that:

The construction of the shipway from the Great Lakes to the sea is imperative both for the relief and for the future development of a vast area in the interior of the continent.

The shipway should be constructed on the St. Lawrence route, provided suitable agreement can be made for its joint undertaking with the Dominion of Canada.

Of its benefit to the entire nation, the Commission said:

In the wider view, the increased prosperity of the mid-continent, the relief of many of their present economic difficulties, and development of huge water power for stimulation of industry and commerce in New England shall add to the prosperity of the country as a whole and thereby benefit every citizen and every city.

A New England committee, consisting of prominent citizens of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut, of which Col. Charles R. Gow of Boston is chairman, has made a study of the subject, and a few months ago made a report unanimously recommending the St. Lawrence route. I quote from its conclusions:

It is our belief that a reduction in transportation costs is the primary requisite of the central section of the country today and that its accomplishment would afford more real relief to the farming and other elements of that community than would any of the proposals which so far have been advanced for the proposed amelioration of the farmers' condition.

Every impartial body that has studied this subject has recommended the St. Lawrence Waterway as a great national undertaking of great national benefit. The only opposition comes from the State of New York, and that state is not unanimous in its opposition. A large part of northern New York is enthusiastically in favor of the project. The opposition is selfish, fearing that the commerce of the cities of New York and Buffalo will be injured by the project. It is hard to believe that the intelligent patriotic citizens of that great state when they fully understand the question will be in favor of compelling the distressed farmers of the West to pay a wholly unnecessary toll to the cities of New York and Buffalo solely for their benefit.

THE ECONOMIC SIGNIFICANCE OF THE ST. LAWRENCE ROUTE

That our farmers of the West have ever since 1920 been in great financial distress we all know. That they have for years been demanding from the Congress relief from their economic condition we also know. In their dire need for relief many of them have become the innocent victims of designing politicians who make impossible promises to them, and propose remedies that cannot stand either the test of constitutional authority or common sense.

Because these things are so should not cause us to fail to realize that our farmers are suffering under a great economic handicap, and because most of the plans that are proposed for relief are impracticable or unconstitutional should not cause us to take the position that there is nothing the Government can do for them. We are living in an age of organization. Manufacturing is organized; finance is organized; labor is organized; mining is organized; but our farmers are not organized. The farmer is essentially an individualist and the agricultural industry does not lend itself to either the corporate form of manufacturing or the association form of labor. The coöperative organization is the only practical form open to the farmer, and such organization as to a staple product produced generally throughout the country is very difficult. The result is that he finds himself paying high prices for everything he has to buy, produced under conditions that prevent excessive surpluses.

The farmer, however, goes right on producing crops greater than domestic consumption can care for, and he has a surplus which must find a market abroad. In such cases he receives very little benefit from tariff rates, and he therefore buys in a high market and sells in a low market. In wheat, especially, he gets as a rule the Liverpool price, less the cost of transporting his wheat from his railroad station to Liverpool, and thus the price is fixed, not only for wheat that he ships to Liverpool, but also for the wheat that he sells to be consumed in the United States. The farmer, also, pays the transportation rate upon everything that he buys. If he buys a Ford car he pays the Detroit price plus the transportation rate to his nearest railway station. If he buys a piece of agricultural machinery he pays the factory price, plus the transportation rate to his town, and so with all his other purchases. The farmer is the only American engaged in industry who pays the transportation upon both what he buys and sells. It is for this reason that the farmers of the West, far from markets, are constantly clamoring for lower transportation rates, and often demand such low railroad rates that if granted would throw every railroad serving them into bankruptcy. True, most of the farmers' troubles are economic, beyond relief at the hands of the Government, but this makes it all the more

necessary that when the Government can give him real assistance that is sound, and rational, it should do so without any delay. When it can lower his transportation costs without injustice to anyone it should not hesitate to do so. The St. Lawrence Waterway furnishes this opportunity. Mr. Alfred H. Ritter, Transportation and Expert Specialist, has written a book upon this subject embodying the results of his studies of the transportation economics of the St. Lawrence project. He estimates the saving to the farmer in transportation rates upon grain to be about ten cents per bushel. He states that the average export movement of United States grain from Atlantic seaboard and St. Lawrence ports for the years 1921 to 1923 averaged 192,000,000 bushels, and upon this alone our farmers would have saved nearly $20,000,000 a year if they could have used the St. Lawrence Waterway. He also estimates there would be a general enhancement in price of five cents per bushel generally. Upon the last page of his book, under the Title "Conclusions," Mr. Ritter says:

> The probable transportation savings on grain alone are equal to five per cent on $800,000,000, while the annual transportation savings plus farm price enhancement are estimated to equal or exceed the total expense of the improvement properly chargeable to navigation, under the original project submitted to Congress by the International Joint Commission.

But it is not grain alone that will be transported over this waterway at a great saving of transportation costs.

The flour mills of Minneapolis in 1922 exported 659,000 barrels of flour. Mr. Ritter estimates that the St. Lawrence Waterway will effect a saving of $6 per long ton on flour shipped from Minneapolis to Europe.

Our packing house exports now amount to more than 2,000,000,000 pounds annually. Seventy-three per cent of this, or 1,560,000,000 pounds, originate in the territory tributary to the Great Lakes. Mr. Ritter estimates that upon shipments of these products from Chicago to London the St. Lawrence route will effect a saving of $17 per ton in transportation cost.

The heart of the automobile industry of the world is situated upon the Great Lakes. Exports of automobiles are increasing every year. The rail rate to the seaboard is high. It is estimated that over 115,000 tons of automobiles will be exported annually over the St. Lawrence route. I might name iron and steel products, agricultural implements, and many other commodities produced in territory tributary to the Great Lakes.

Thus far, I have spoken only of exports of commodities produced in Great Lakes territory, but imports of commodities used in this territory could also be carried over this waterway at a great saving of transportation costs. One of the most important of these is rubber. Our imports of rubber amount to more than 300,000 tons annually. Sixty-one per cent of the rubber imported is used by manufacturers tributary to the Great Lakes. This amounts to about 200,000 tons annually that could be carried over the St. Lawrence route, and Mr. Ritter estimates that this will effect a saving of more than $5 per ton in transportation costs, or more than $1,000,000 annually. This saving will effect every user of automobiles in the United States.

For the immediate territory affected imports of sugar will be the most important. The Great Lakes territory produces about 900,000 tons of beet sugar annually. The people of this territory consume about 1,800,000 tons annually, thus making necessary imports of 900,000 tons for their use annually. Every ton of this could come

over the St. Lawrence route at an estimated saving of transportation costs of from $6 to $13 per ton. In addition there will be imports over this route of fish, rice, tropical fruits and nuts, wood pulp, manganese, etc., and other commodities, amounting to more than 3,000,000 tons annually, at a very great saving of transportation costs.

The Hoover Commission already referred to and the Department of Commerce estimate that from 21,000,000 to 25,000,000 tons of commodities are at present available for shipment over the St. Lawrence route annually, 80 per cent of which represents exports and imports. This will be very largely increased by the time the St. Lawrence route can be completed. At an average saving of only $2.50 per ton in transportation costs, this will amount to more than $50,000,000 annually. This represents a 4 per cent return on $1,250,000,000.

But it is not only lower costs of transportation through admitting ocean-going vessels to the Lakes that will be of economic benefit to the country. In connection with the improvement of the St. Lawrence for navigation, vast water powers will be developed, ultimately amounting to 5,000,000 horsepower. About 2,250,000 of this amount will be developed along the international section of the river between New York State and the Province of Ontario, one-half of which will belong to the United States. The plan calls for the immediate installation of 1,160,000 horsepower with provision of doubling this amount when a market for the power is available at an additional cost of only $32,000,000. When the full power on the international section is developed the cost for development and installation will be only about $100 per horsepower, which will permit its sale to New England and New York users at a much lower price than power can be produced for in any other way.

The construction of the St. Lawrence route with its incidental development of water power will save many New England industries from ruin.

Another great economic benefit to the entire country will be in the development of the nation's merchant marine. The people dwelling along our coasts have a keen realization of the value of a merchant marine flying the American flag, but the people of the interior, living far from our coasts, do not realize its importance and have been so indifferent upon the subject that legislation necessary to secure a permanent American Merchant Marine has never been enacted.

The St. Lawrence Waterway will add 4,000 miles to the coast line of the nation, an increase of nearly 50 per cent. When ocean vessels ply upon the Great Lakes there will be a visible demonstration of the desirability of maintaining the American flag upon the seas, and sentiment for an American Merchant Marine will then be as strong in the Middle West as it is now upon our coasts. In the great harbors of Chicago, Milwaukee, Superior, and Duluth, ships flying foreign flags will lead to a demand from that section that ships flying the American flag shall outnumber all others.

I have said nothing thus far about the cost of this improvement. The Hoover Committee estimates the navigation cost, that is the cost to the United States and Canada, at from $123,000,000 to $148,000,000 to be divided between the two countries. All additional costs would be chargeable to power which will take care of itself and cost the two governments nothing. It estimates the cost of the Lake Ontario-Hudson route at $506,000,000 and the so-called All-American route at $631,000,000 all chargeable to

navigation to be paid by the United States alone, for no water power will be developed on either of them.

There is no comparison possible between these routes and the St. Lawrence route from an economic standpoint.

I have reserved for my last point the consideration of the objection that the St. Lawrence Waterway traverses foreign territory, and that from the standpoint of our national defense the St. Lawrence Waterway should not be favored. It is said that, should we be engaged in war with Great Britain, this waterway would admit her dreadnoughts into the Great Lakes, and that our great cities upon those Lakes could be easily destroyed by them. Fortunately, this matter has already been investigated by the United States Government. I quote from a report made by the Board of Engineers of the War Department in 1918:

> Such passage could be quickly and completely obstructed by the destruction of the locks in these canals by shell fire, notably in Canadian St. Lawrence River canals where all locks are within seven thousand feet of the United States main river shore, and some not over one half mile therefrom.

So if there was the slightest foundation for the theory that this ocean waterway might admit the English Navy into our Great Lakes and thus become a menace to us if we ever had trouble with Great Britain, our own War Department shows conclusively that every one of these locks and canals could be destroyed by shell fire from the American side without the slightest difficulty.

But there is another aspect of this question which should be considered, and that is that our determination of this matter should not be affected by any theory that the United States and Great Britain may hereafter become involved in war between themselves. If we are to assume that such is a probability, we should also recognize that should it ever occur such a war would end our civilization, and the world would be destroyed so far as we or our descendants would have any interest in it whatever.

On the contrary, the construction of this waterway as a joint undertaking by the United States and Canada will more strongly cement the friendship between us and our great neighbor to the North. We now have treaty rights giving us equality upon Canadian waters and Canadian equality upon American waters. Instead of being a menace to our National Defense it will furnish the greatest object lesson of friendly coöperation between two great nations that the world has ever known.

It is not within the purview of this paper to discuss the details of the plan of the improvement, its present status, and the steps necessary to bring it to successful completion.

I have sought to show that it is a great national undertaking of tremendous economic benefit not only to the interior of the nation but to the entire country, and it should receive the support of every patriotic American.

The Salient Geographic Factors of the Colorado River and Basin

By Henry F. James
University of Pennsylvania

THE devastating flood which during the past summer laid waste the lower Mississippi valley was a solemn and sinister reminder that the imperative need of flood control has not been met. It calls sharply to mind, too, the great urgency of the whole problem of effective distribution and utilization of waters. A review, therefore, of the factors relating to this problem in the Colorado River Basin is not untimely.

Since the flood menace in the Lower Colorado Basin has been temporarily mastered, time is available for such a careful study of all phases of the problem as will result in a thorough understanding of the situation, *i.e.*, the utilization of water for irrigation, for domestic supply and for water power, together with such closely allied matters as state and federal jurisdiction, interstate control and distribution and international rights. These are problems of the first magnitude—the work of engineers and statesmen. The phase of the problem here presented is merely a description of the salient geographic factors of the Colorado River and its basin.

The Colorado Basin

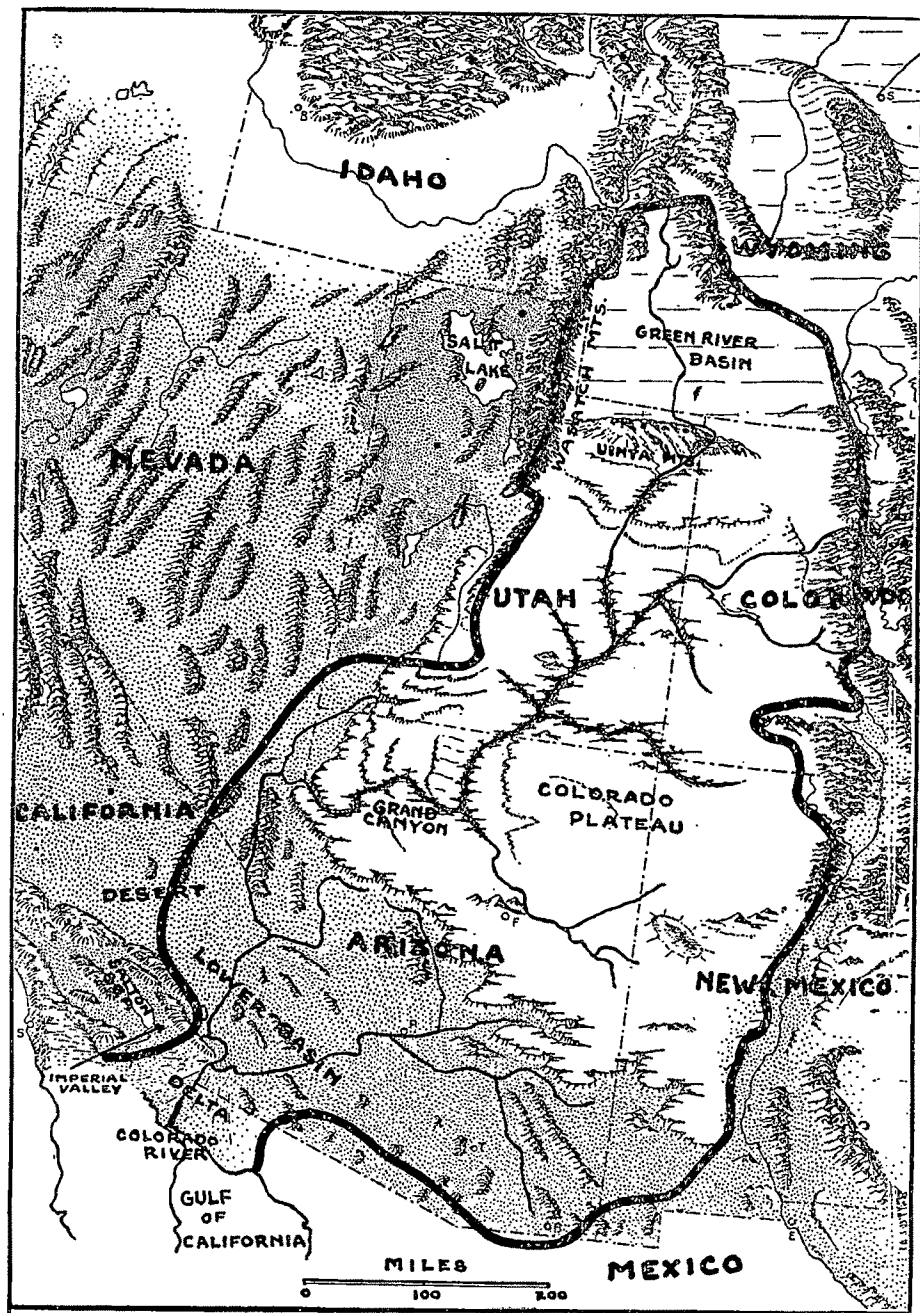
The Colorado Basin in actual territory is greater in extent than any one of the nations of Germany, France or Japan. Lying within the confines of seven states, it covers one-thirteenth of the area of the United States and a considerable section in northwestern Mexico. (See map, p. 88.)

Extreme variations prevail within the basin, from heavily timbered mountains on the high portions of the continental divide to desert areas, the most forbidding in the country; from places famed as summer resorts to those where the heat at times is almost unbearable; from crystalline mountains of solid granite to plains of silt, ash-like in their appearance and from the widest, the deepest, the longest and the grandest chasm on earth—the Grand Canyon—to a meandering shallow bed of soft fine alluvium.

This basin may be divided geographically into two, possibly three, regions. Two portions are decidedly distinct. The lower third is located in the states of Arizona, California and Nevada, and extends a short distance into Mexico. In general, its elevation is but little above sea level, though scattered here and there are ranges of mountains that rise to heights of 2000 to 6000 feet and depressions that fall below sea level. Its northern line of demarcation is a line of cliffs, the Grand Wash Cliffs. These present a bold, often vertical, step that leads hundreds or thousands of feet to the table land above. This is the region of the great American Desert, a land of excessive heat and aridity. Recorded temperatures have been known to reach 130° F.;[1] the annual rainfall in places is less than two inches.[2]

[1] Brown, John S., "The Salton Sea Region—California." U. S. Geological Survey, Water Supply Paper 497. Washington, 1923, p. 13.

[2] The annual precipitation ranges from an inch and a half to eight inches a year with temperatures ranging from 32° F. to 120° F. U. S. Geological Survey, Water Supply Paper 556, p. 12.



MAP OF THE COLORADO RIVER BASIN AND ASSOCIATED REGIONS.

PHYSIOGRAPHIC DIAGRAM COURTESY OF A. K. LOBECK

The prosperity of this southern section rests upon agriculture under irrigation, but its well-being is recurrently threatened by inundation during flood and its progress is retarded by a shortage of water during dry periods. In 1924 a loss totalling millions of dollars was sustained by the farmers in the Imperial Valley because of lack of water.

In many ways this lower section is similar to the Great Valley of California. Both receive the drainage of the large rivers of the interior. In the Gulf of California the Colorado River has built up its delta and in the California Valley the San Joaquin and Sacramento Rivers have formed theirs. The two areas are nearly at sea level. In each valley the displacement of the sea by alluvium has occurred within comparatively recent geological times. If the land should sink slightly less than 1000 feet, the California Valley would be flooded with sea water through the Golden Gate, while the tides of the Gulf of California would be carried far north of Yuma and the land would be flooded for 200 miles northwest of the present head of the Gulf. Both sections depend upon the melting snows of the higher areas for their well-being. Separating these two valleys are the high ranges of the Western Cordillera with their greatest break at the pass of San Gorgonia. Through this gateway pass the trains of the Southern Pacific Railway at an altitude of 2580 feet, thus binding the interior to the Pacific.

The northern two-thirds of the Colorado Basin is a land of mountains and plateaus with an upper basin in Colorado, Utah and Wyoming (Green River Basin, see map, p. 88) and a plateau section (Colorado Plateau, see map, p. 88) in Utah, Nevada, California and Arizona. In the upper basin the northern watershed is extremely rugged and fairly heavily timbered. Its streams flow through a succession of long, deep, narrow canyons transversed by short valleys that contain small tracts of arable meadow land. Severe winters prevail, but the growing season, although cool, is pleasant with enough warm weather for rapidly maturing crops. Broken plains and scarred plateaus of sedimentary origin are, however, the prevalent topographic features. The annual rainfall of only nine inches on the plains and meadow lands necessitates irrigation which is made possible by natural mountain lake storage and artificial reservoirs. Undeveloped reservoir sites, such as the Kremmling site, the greatest in Colorado, renders possible a more complete utilization of this region.

The plateau part extends from Lee's Ferry to Grand Wash Cliffs. In general, the elevation varies from 4000 to 8000 feet. Great ranges of snow-clad mountains with peaks ranging from 8000 to 14,000 feet are a conspicuous part of the landscape. All winter long on this mountain-crested rim, snow fills the gorges, half burying the forests and mantling the mountain tops. With the approach of the summer sun the life-giving waters are released to go tumbling down the mountain side in millions of cascades. In the words of Major John W. Powell,[3] "these ten million cascade brooks unite to form ten thousand torrent creeks; ten thousand creeks unite to form a hundred rivers beset with cataracts; a hundred roaring rivers unite to form the Colorado which rolls, a mad turbulent stream, into the Gulf of California." For more than a thousand miles along its course through the plateau section, the Colorado has

[3] Powell, Major J. W. "First Through the Grand Canyon—Being the Record of the Pioneer Exploration of the Colorado River in 1869–1870."

cut for itself a canyon not continuous but broken here and there by narrow transverse valleys. The idea of the inaccessibility of the country can best be conveyed by the words of the same Major Powell. "Every tributary river in the plateau has cut another canyon; every creek has cut a canyon; every brook runs in a canyon; every rill born of a shower, and born again of a shower, and living only during these showers has cut for itself a canyon; so that the whole upper portion of the basin of the Colorado is traversed by a labyrinth of these deep gorges." It is a land of strange and weird physical features built on a gigantic scale. Hardly less noticeable than the canyons are the long lines of cliffs, great geographic steps that stretch for hundreds of miles across the landscape and rise frequently thousands of feet into the air. These cliffs are great blocks tilted in such a way that after one has climbed the steep, almost vertical face, he may descend by easy grades to the foot of a second escarpment. Great gateways have been cut through the cliffs by the intermittent streams making possible a journey from the plain below to the terrace above, from arid plains below to forests of pine and fir above with noticeable flora gradations in between. The surface of the plateau is also broken by low mesas that are dry and treeless with frequent gaunt surfaces of naked rock exposed. The region is further diversified by vast systems of fissures, huge deep cracks that are miles and miles in length. In times past from these crevices have poured floods of lava, great sheets of black basalt, that have covered mesas and table lands alike. Here and there along the fissures are found conspicuous landmarks, huge barren cinder cones that are probably the last dying evidence of great subterranean forces.

The unnavigable rivers, buried deep in canyons like the great desert wastes, have prevented easy access to the region so that much of the plateau is relatively unknown. Even today in the canyon region from the mouth of the Green River to the Grand Wash, a distance of 500 miles, there are only three points at which it is possible to reach the river with a wheeled vehicle. In this remote region the Indian still retains his ancient culture. Thirty thousand [4] Hopi and Navajo Indians live on 20,000 miles of Indian reservation. Their life is hard. They still live in the fortress homes built by their ancestors on the easily defended tops of the mesas or follow their flocks and herds from water hole to water hole. The remaining part of the region is given over to a few ranchers and miners with irrigationists located along the more open stretches, but in many places not a living thing is seen, nothing but dry rock in the mountains and dry dust in the valleys.

THE COLORADO RIVER

The main artery of this basin, the Colorado River, is approximately 2000 miles long. It extends from Wyoming to Mexico. The characteristics of the river are the key to its many problems. The Colorado may be regarded as one of the most remarkable rivers in the world. It is the greatest undeveloped resource of the states through which it flows, for "it combines in proper sequence for complete use a large quantity of water, a great concentration of fall, reservoir sites for the control of flow, sites for power plants and several million acres of irrigable land below the stretch where power may be developed." [5]

It has frequently been called the

[4] Smith, J. Russell, "North America," p. 472.

[5] Grover, Nathan C., Water Supply Paper No. 556, p. 3, U. S. Geological Survey.

Nile of America and, like the Nile, is subject to potential flood conditions during each summer. The Nile appears to be the greater stream.[6] Its drainage area is 5.7 times larger, with a 3.8 greater annual precipitation. The run-off per square mile of the Nile is 1.9 times greater, but the ratio of run-off to rainfall is two times smaller. The Nile also has a 10.8 times greater discharge than the Colorado. The maximum flow of the Nile, which occurs chiefly about September 1, amounts to approximately 353,000 second feet.[7] This is larger than that of the Colorado by over 200,000 second feet. The maximum flow of the Colorado occurs in May, June and July, a time most propitious for the irrigator. The minimum flow of the Colorado is only from 2500 to 3000 second feet as compared with 14,500 second feet, the minimum flow of the Nile. Thus the necessity for water storage such as is accomplished by the great dam at Assuan, Egypt, is shown to be more urgent still in the Colorado Basin. This fact is also clearly indicated in a study of the main flow of the two rivers. For the period 1894–1910, the main flow of the Colorado was not above 26,000 second feet, while that of the Nile amounted to 115,800 second feet.

The profile of the Colorado River is likewise one of its dominant characteristics. In 1800 miles, the river drops from an elevation of 13,579 feet [8] to sea level. The Nile has only a drop of 7000 feet [9] in a distance of 3473 miles. If comparisons are made with many other power-yielding streams of the United States, the potential power possibilities of the Colorado appear to be enormous. The Mississippi River from Cape Giradeau to the Gulf of Mexico has a drop of only eight inches [10] per mile. The power possibilities of the Tennessee are considered important, but that river has a drop of less than 500 feet between Knoxville and Paducah, a distance of approximately 700 miles.[11] The canyon section has great possibilities in the concentration of water power sites. Between Green River, Utah, and Parker, Arizona, there are at least twelve favorable dam sites where a continuous development of over 4,000,000 [12] horsepower can be made. In this respect its only superiors are the St. Lawrence and Columbia River Basins.

The Colorado River and its tributaries are hard-working streams. They bring to the delta, 105,000 [13] acre feet of silt per year. This amount would cover 105 acres to a depth of 1000 feet. In terms of yards, this equals 170,000,000, or an amount equal to two-thirds of the total material excavated in the construction of the Panama Canal. Six million average railroad cars would be needed to transport this material. Driftwood is also carried during flood periods. In the flood of September, 1923, hundreds of logs 20 to 30 feet long and 2 to 3 feet in diameter passed through the Grand Canyon.

With this description of the geographical conditions of the Colorado River and its Basin as a background, we may now turn to a brief analysis of some of its important problems.

[6] All statistics relative to this comparison taken from the U. S. Geological Survey, Water Supply Paper No. 289, pp. 26–27.

[7] Second foot is an abbreviation for cubic foot per second and is the rate of discharge of water flowing in a stream, one foot wide, one foot deep, at a rate of one foot per second.

[8] Clark, W. G., "The Colorado River," p. 7.

[9] Encyclopedia Britannica, 11th edition, Vol. 19, p. 692.

[10] *Ibid.*, Vol. 18, p. 604.

[11] Brown, R. M., "Utilization of the Colorado River," *Geographical Review*, July, 1927, p. 456.

[12] U. S. Geological Survey, Water Supply Paper 556.

[13] *Ibid.*, p. 16. See table.

THE FLOOD MENACE OF THE COLORADO[14]

The river emerges from the hills and canyons as a law-abiding stream for ten months of the year. For the remaining two months in the early spring, it is almost uncontrollable. Instead of a blessing it then becomes a threat to man and all his works in the Lower Basin. The value of the property that is menaced by these floods exceeds $100,000,000, while at least 50,000 people are living in the shadow of just such a great catastrophe as occurred in 1905 and was repeated over a very limited area in 1909. In 1921 a recurrence of these disasters was prevented only by a shift of the wind that drove the waters back. Man's existence here is precarious in the extreme for on the holding of a long thin line of granite-faced levees depends his safety.

The geographical nature of the country itself makes floods possible. Some thousands of years ago this endangered land was part of the Gulf of California, a great arm of the ocean that extended 150 miles inland from its present limits. In fact, its waters probably washed the slopes of the San Jacinto and San Bernardino Mountains and covered a land that is now arid mountains and desert plains. The Colorado River emptied its waters into an eastern arm of this body of water that reached nearly to the present site of Yuma. Into it has been deposited through aeons of time the mud and rock scoured from high mountains and worn out of deep canyons. Inch by inch the water was driven back until this eastern basin was entirely filled. Onward spread the delta until it reached the eastern base of the Cocopa Mountains. Thus was formed a dam that separated the Gulf into two parts, one entirely cut off from the ocean. The dam increased in height and breadth from decade to decade until today the dam above sea level is nearly 100 miles wide. On top of this delta bridge flows the Colorado River at a height of approximately 30 feet above the sea and actually higher than the adjacent country. To the northwest lies the old Gulf bed, now a region of interior drainage with but a remnant, the present Salton Sea, left of that historic ocean arm. The lowest part of this basin is 300 feet below the level of the river and only 70 miles away. To the south lies the recent delta land with the Gulf of California 50 miles in the distance. The waters of the Colorado pass down the gentle slope towards the Gulf.

The direction of the river is unusual for a grade nearly ten times as steep leads into the Salton Basin and Imperial Valley. Forty-three thousand people, at least the population of the Imperial Valley of California, desire a continuation of this condition. They wish for no replica of the biblical flood. A modern system of levees has been constructed at which the river in recent years has really pounded in

[14] References consulted in the study of floods are:

(1) An article by James H. Gordon, *Monthly Weather Review*, February, 1924. "Problems of the Lower Colorado River," pp. 95–97.

(2) An excellent scientific discussion of river control in the Colorado River Delta by H. T. Cory, in Paper No. 1270. "Transactions of the American Society of Civil Engineers," Vol. 76, 1913.

(3) Mendenhall, Walter C., U. S. Geological Survey, Water Supply Paper No. 225.

(4) Entenman, P. M., "Flood Danger in the Colorado Delta," *Engineering News Record*, March 31, 1927.

(5) Priest, R. M., "Channel and Levee Conditions in the Colorado Delta," *Engineering News Record*, March 17, 1927.

(6) Sykes, Godfrey, "The Delta and Estuary of the Colorado River," *Geographical Review*, April, 1926, Vol. 16, No. 2.

vain. It is a risky situation at best, for not always has the river flowed in its present channel. Time and time again in the ages past the geologists tell us that the river has turned its waters into the interior basin and at a later date turned again towards the Gulf. Up until 1905, for many hundreds of years, it has flowed untroubled to the Gulf. The great interior basin became practically empty of water through evaporation and seepage for the run-off from the mountains that surround the sink is too slight to maintain a permanent water body in this region. From a great arm of the ocean it had become a desert waste, sun-baked and desolate. Engineers were determined to harness the Colorado, making of its water a blessing to this parched land instead of a curse. They found the river difficult to handle. Canals that made possible the proper distribution of the water quickly silted up. New channels had to be built constantly as a greater and greater demand for water came with increased population. Man thus weakened the natural dams that kept the river in its proper channel and also neglected to provide sufficient protective head works for the canal that had a gradient much greater than that of the river. The result was that, in 1905 and 1906, during the periodical floods, the river broke through and hurled 87 per cent of its volume into the Salton Basin. Only after sixteen months of effort and an expenditure of $2,000,000 was the river turned back into its old channel. But the battle is not over. The river is bringing down its 6,000,000 carloads of silt and mud each year, a hundred thousand acre feet of damming material. Man in order to hold the balance of power has thrown in 6000 carloads of rock. How long can this unequal warfare be continued? Each year the threat of disaster is renewed and the situation becomes more and more critical. With the increase of cotton and alfalfa fields, orchards and vineyards, another break would be a calamity. The levees are not positive preventives. Something must be done to regulate the flow of the stream during its violent periods. The building of dams and the ponding of its waters in a few of its great canyons is the only permanent preventive of a possible catastrophe.

THE PROBLEMS OF IRRIGATION

The streams of the Colorado Basin are already utilized for irrigation to a considerable extent. From a probable beginning on the upper Greer River in Wyoming, the irrigated lands had increased in acreage until, in 1922,[15] the total area irrigated amounted to 2,398,000 acres. Of this amount approximately 1,500,000 acres[16] were irrigated in the Upper Basin. This was an increase of approximately 1,000,000 acres since 1899.

Irrigation is necessary here because of the climate. Nowhere do the areas that are possible to irrigate have a rainfall of over eight inches. Summer temperatures of 100° F. are not uncommon even in the plateau section of the basin. In the Lower Basin the chief climatic characteristics are the excessive summer heat and dryness. During the five hot months, the temperature will average over 90° in the lowlands. The climate is trying for man and beast. The air is not stagnant. Gales with their accompanying sandstorms that last for a few hours are not uncommon. The heat and the wind together keep the surface very dry and cause excessive evaporation from exposed water bodies. Rain in

[15] See table on page 94.

[16] LaRue and Holbrook, U. S. Geological Survey, Water Supply Paper No. 556, Appendix A, Water Supply, p. 109.

TABLE I.—IRRIGATED AND IRRIGABLE AREAS IN THE COLORADO BASIN IN 1922.

(Extracted from an article by R. M. Brown, *Geographical Review*, July, 1927)

	Areas in Acres		
	Irrigated 1922	Additional Irrigable	Total
Upper Colorado Basin	1,477,000	2,740,000	4,187,000
Lower Colorado Basin	521,000	1,467,000	1,988,000
Gila Basin	430,000	400,000	830,000
Totals	2,398,000	4,607,000	7,005,000
Wyoming	235,000	522,000	757,000
Colorado	800,000	1,460,000	2,260,000
Utah	386,000	377,000	763,000
Nevada	7,000	7,000	14,000
New Mexico	50,000	408,000	458,000
Arizona	493,000	1,312,700	1,806,000
California	426,700	520,300	949,000

the form of cloudbursts occurs at times. The flood waves so caused are responsible for practically all of the desert erosion, but the total rainfall annually is not over eight inches.[17]

Irrigation is possible here because of the supply of surface and ground water available. From the former source practically all dependence will be placed by future reclamation projects. The amount of surface water used at present amounts to 6,700,000 acre feet (1924), of which slightly over 3,000,000 acre feet were used in the American section of the Lower Basin and 780,000 acre feet in Mexico. The United States Reclamation Service believes that eventually the Upper Basin will require annually for direct use 6,550,000 [18] acre feet of water and the Lower Basin 8,282,000 acre feet. There will also be some loss through evaporation and seepage from river, canal and reservoir. The mean annual flow of the Colorado at Yuma, Arizona, from 1894–1911 was 12,388,000 acre feet.[19] In 1894, however, it amounted to only 5,390,000 acre feet, while in 1909 the discharge equaled 26,000,000 acre feet. It can thus be clearly seen that the maximum development of irrigation in the Colorado Basin cannot be obtained without the development of a comprehensive plan for storage and regulation of the waters of the Colorado River. The Lower Basin at present is beginning to feel a shortage of water during exceedingly dry periods.

The problem of storage and regulation is difficult because of the number of states and nations involved. The border states have not yet reached an agreement in regard to the distribution of water between them, although the Federal Government, in 1922, through the person of Herbert Hoover, brought the state delegates together in Santa Fe, New Mexico. The result

[17] U. S. Geological Survey, "Some Desert Watering Places," Water Supply Paper No. 224, pp. 12–13.

[18] Includes the amount that will eventually be diverted in the vicinity of Denver to the Mississippi watershed, and in Utah to the Great Salt Lake Basin—in the neighborhood of 440,000 acre feet.

[19] Cory, H. T., *op. cit.*, pp. 1210.

was the Colorado River Compact,[20] which was agreed to at that time by all the participating states with the exception of Arizona. Since then Utah has rescinded her action while the adherence of California is conditional on the building of the Boulder Canyon Dam by the Federal Government. An international agreement is also necessary because Mexico has approximately a million acres of land irrigated or available for irrigation in the Colorado Basin. To further complicate the matter the Mexican projects have been developed largely through American capital and water for the Imperial Valley (California) is brought through the Mexican-American Canal, which is largely located in Mexican territory.

Two engineering problems in connection with irrigation are serious. One is the danger of diverting water from a wide, erratic stream that flows through a shifting channel as does the Colorado on the top of the delta ridge dam. The other is the difficulty of keeping open canals in a region where the water is so heavily charged with silt. During flood stages the water carries all the silt that it is able to transport. The size of the silt particles depends upon the speed of the stream. Records kept of conditions in the Imperial Valley irrigation area indicate that the beds of many of the canals were raised between two and five feet in a period of three years. This reduction in capacity which is slightly noticeable in the larger canals and especially critical in the smaller laterals makes a larger number of canals necessary or constant dredging in order to keep the channels open. The cost of keeping the canals open varies from $50 to $60 per mile.[21] The Imperial Water Company No. 1 maintains in the neighborhood of 400 miles of canals.

It has also been noticed that the soil in places is heavily impregnated with alkali. Alkali is the accumulation in the surface layers of excessive amounts of soluble salts, mainly chloride and sulphate of sodium. All desert soils, especially those of the silt variety, that are fine enough in texture to permit capillary rise of water through them, are likely to become alkali. The Bureau of Soils of the U. S. Department of Agriculture has presented a very unfavorable report[22] regarding the alkali conditions of the soils of the Imperial Valley. It advised the planting of crops, such as sugar beets, sorghum and date palms that are suited to alkaline soils and to abandon as worthless the land which contained too much alkali to grow these crops. The warning was repeated in a later report. The repeated application of water to these lands will have a tendency to increase the alkalinity. This condition will then develop a problem of drainage that has not yet seriously added to the farmers' burden.

Still another fact in regard to irrigation must be realized. What has been the result of irrigation projects already established by the Reclamation Service? Is there a noticeable need at the present time for further development? Bowman[23] states that "the total farming population upon the twenty-four national irrigation projects of the West after twenty-five years of government aid and generosity is but 137,000, a population equal to that of the city of

[20] For the complete text of the compact see 67th Congress, 4th Session, House of Representatives, Document No. 605. An excellent discussion is also given in the "Colorado River, History, Seven States Compact and Future Development," by Walter Gordon Clark.

[21] Cory, H. T., *op. cit.*, pp. 1284–1285.

[22] Field Operation of the Bureau of Soils, U. S. Department of Agriculture, 1901. A later report appeared in 1903.

[23] Bowman, Isaiah, "The Pioneer Fringe," *Foreign Affairs*, Vol. 6, No. 1, October, 1927, p. 61.

Hartford, Conn., or Grand Rapids, Mich." He further emphasizes the fact that "the most trifling improvement of agricultural practice in settled communities will accomplish much more in the production of agricultural products and the growth of population than all the millions that have been poured out upon the irrigation projects of the West in a quarter of a century." Further irrigation development at present appears of doubtful necessity.

POWER DEVELOPMENT

Power development as the keystone of the arch of Colorado River conditions is the hope of those interested. By the sale of power they expect to pay largely the high cost of flood control and irrigation water storage. From a production point of view, their hopes are justified. Nature has been so kind that the average discharge of the river (see page 7) together with its steep gradient and numerous power sites is sufficient to develop from five to six million horsepower of hydroelectric energy. The U. S. Geological Survey has recommended thirteen power sites[24] that would produce 5,743,000 horsepower with maximum use of the water in the Upper Basin.

Three problems vital to the full realization of this ambitious program must be considered. In the first place, storage for flood control and for power development is in striking conflict.[25] "Flood control reservoirs need to be kept empty and ready for flood service, while power development reservoirs need to be kept full to ensure steady power." The noted engineer, Arthur E. Morgan, believes that it is a grave mistake to try to combine them. The question of cost is also paramount. The cost of the Boulder Canyon Project alone, including the erection of a power plant, is estimated in the neighborhood of $75,000,000. If the cost is to be met by the sale of electricity, the question of distance must be considered. It is 250 miles from Boulder Canyon to Los Angeles, the principal market for power. San Diego is approximately 300 miles away; Yuma, Arizona, 250 miles. The principal mining districts in Arizona and Nevada are at a distance greater than 250 miles. Engineers estimate that the Boulder Canyon power would cost $50 per horsepower delivered in Los Angeles where power is now generated by steam at a cost of $40 per horsepower. It appears highly problematical whether power generated in a desert hundreds of miles from available market can be put on a paying basis for many years to come if at all within the lifetime of the men backing the proposition.

Problems of power, flood control, water diversion for irrigation and urban purposes and the disposal of silt cannot be solved singly. Together they make up the problem of the most economic utilization of the waters of the Colorado. The flood menace must be conquered within a few years or disaster will result, but consideration of the other factors of the equation is essential, or else in providing for the immediate present mistakes will be made that will prevent the fullest utilization of this great river and postpone indefinitely the complete development of the adjacent states. At present, there are many disputed points. Dam sites cannot be agreed upon. State rights vs. federal control is a burning question. Private corporations are fighting the national government for control. The interested states are unable to agree. These differences will no doubt be ironed out eventually. It is

[24] See table, p. 46, Water Supply Paper No. 556, U. S. Geological Survey.

[25] Morgan, Arthur E., "The Mississippi," *Atlantic Monthly*, November, 1927.

a gigantic task, however, that must be studied carefully and scientifically in order that the Colorado River, now a menace, will be eventually harnessed for man's benefit and man's enjoyment.

Legal Problems in Colorado River Development

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IN the present article it is my purpose to discuss but a very limited number of the legal questions in Colorado River development. Numerous briefs have been written by firms of competent lawyers whose professional duty it is to give advice on such questions as whether or not Arizona is correct in asserting her right to tax each unit of power developed within her borders, whether or not Denver may divert water from the Colorado watershed, whether or not there is any possibility of Los Angeles being able to secure title to water which it is anticipated will be stored in Boulder Dam, and a score of other important issues of similar or different nature. Accordingly, in the selection of the subjects treated I have been guided by the belief that a person occupying the position of a disinterested observer and student will be performing the best service by calling attention to the broad outlines of a plan for the improvement of this interstate stream. To such a plan I have devoted major consideration, with the result that many obvious legal questions are omitted from the present paper. But although these be omitted it is with the hope that the plan suggested may prove worthy of consideration and thereby compensate for the neglect of other material.

The topics which are to be discussed in the succeeding paragraphs may be listed as follows: the present importance of the Compact drafted at Santa Fe in 1922, the legal background of the Compact, the proper sphere of activity of an interstate Colorado River commission, and a suggestion that conservancy districts be organized in the interested states for the purpose of contracting with each other relative to Colorado River matters.

Present Importance of the Compact

Without doubt the Colorado River Compact drafted at Santa Fe, New Mexico, in 1922, will continue to be the starting point of all discussion for any plan finally agreed upon to further Colorado River development. Fundamental groundwork was laid by the drawing of that agreement. Nor has the stormy course experienced by the Compact during the past five years served to make the preliminary work of less value. Certain underlying issues are now more widely apparent than was true of the situation several years ago, in spite of the fact that the seven-state treaty is not effective. Arizona's consistent refusal to ratify, California's ratification conditioned upon storage, and Utah's recent step in rescinding her earlier ratification, together with Colorado's insistence that not a shovel of earth be turned for the development of any project in the Colorado below Lee's Ferry before the Compact shall have been accepted by at least six of the seven states—a point of view at one time written into the Swing-Johnson bill but now replaced by the idea that construction may proceed upon acquiesence of the Compact's terms by only three of the interested states—have all combined to make the Compact the most important single

[1] Author of "The Colorado River Compact," pp. xxiv, 527, published by Southwest Research, Los Angeles.

document in the entire Colorado River controversy.

LEGAL BACKGROUND OF THE COMPACT

From a study of the minutes of the twenty-seven meetings of the Colorado River Commission at which the different paragraphs of the Compact were drafted, and from a careful investigation of other source material, I am convinced that the sponsors of the proposed seven-state agreement thought that such a treaty was necessary as a means of circumventing the prior appropriation system of determining water rights on the Colorado. The *Wyoming* v. *Colorado Case*, 259 U. S. 419, decided by the Supreme Court of the United States on June 5, 1922, held that, as between two prior appropriation states, water rights on an interstate stream would be determined upon the basis of prior use irrespective of state lines. This had been for many years a contested point in water rights litigation involving interstate streams, but the possibility of a decision such as the Supreme Court gave in the Wyoming-Colorado case, had been foreseen by those familiar with the question. Coming as it did during the hearings of the Colorado River Commission in different cities of the Southwest preliminary to the Santa Fe meetings, the decision in *Wyoming* v. *Colorado* confirmed the fears of representatives of Colorado and other upper basin states that the stage was being set for the permanent appropriation of Colorado River waters by water users of the lower basin states to the everlasting detriment of the upper basin.

The chief factor which contributed to this belief was the more rapid movement of population from the Eastern centers to areas in the lower basin, particularly southern California, than to the areas of the upper basin. Along with the population came an almost insatiable desire for water for domestic and agricultural purposes because of the general aridity of the lower basin areas. More than this, a large population meant a corresponding political and financial power to build the works required in the process of placing the waters of available streams to beneficial use.

Little wonder, then, that legal representatives of the upper basin states upon surveying, on the one hand, the rules of law applicable to problems of this kind and, on the other, the trend of events pointing directly to the appropriation of large quantities of water for beneficial purposes in the lower basin at an earlier date than the water would be needed in the upper basin, were spurred by the *Wyoming* v. *Colorado* decision to renewed efforts in their attempt to modify the prior appropriation doctrine of water rights with respect to the waters of the Colorado. States of the lower basin had nothing to gain by changing the prior appropriation doctrine so long as development continued under the appropriation system; states of the upper basin had everything to gain by changing that system, for if the prior appropriation doctrine continued to apply, the states of the upper basin might find that, due to its prior application to beneficial use by the lower basin, no unappropriated water would remain for use in the upper basin at the time that the upper basin becomes ready to use it.

While it is true that states of the lower basin had nothing to gain by changing the prior appropriation doctrine so long as development continued under that system, it should be noted that such development, as a matter of fact and until a change of policy by the Federal Power Commission, is at an end unless some uniform plan is made for the Colorado's development. For several years the Federal Power Com-

mission has been reluctant to grant permits for Colorado River construction because of the obvious benefits to be realized from the use of a coördinated plan of which each individual project should be a part. But to projects in which large sums have been expended in preparatory work, such as the Girand project, the Federal Power Commission is said to stand ready to give preferred consideration upon the withdrawal of the general order of suspension of permits. This general order may be withdrawn at any time that the Commission deems reasonable. That is, if the members of the Commission believe that it is unlikely that a unified plan can be agreed upon by the seven states, they will perhaps allow construction of the better projects to proceed without reference to a general plan. This will, of course, make possible the appropriation of water and the vesting of rights.

THE PROPER SPHERE OF ACTIVITY OF AN INTERSTATE COMMISSION

One of the legal questions of prime importance in Colorado River development is the question of whether or not the seven states may enter into a compact and thereby achieve the legal result of dividing the water of the Colorado in the manner attempted by the terms of the Santa Fe agreement. That Compact, it will be recalled, attempted to apportion a definite amount of water to the upper and lower basins respectively.

But can the apportionment of the waters of an interstate stream, even though ratified by the legislatures of the states concerned and by Congress and in the event that it is finally determined by the courts to be legally sound, be of any practical benefit if there is not a sufficient amount of water in the river to satisfy present users and those who wish to become appropriators, some of whom now have their applications on file with the state commissions or with the Federal Power Commission or both? Is it within the legal power of a group of states to enter into an agreement with one another, such agreement being sanctioned by the legislative branch of the Federal Government, and by the terms of said agreement superimpose a new system for the determination of rights in the waters of an interstate stream which may conflict with the legal methods already established by the individual states for the determination of water rights? Is it not true that the first step in Colorado River improvement by the coöperative effort of the interested states should be a survey of the water rights now recognized and vested under the laws of the several jurisdictions? Present users must be taken care of regardless of what particular method of improvement is finally selected.

It is also probable that certain applications now on file with the various states would be found to be entitled to priority under the laws of the states having jurisdiction. Such inchoate interests should also be included in the survey. With these data at hand an interstate commission, called a Colorado River Authority in my book, would be in a position to recommend those steps for the development of the stream which would best serve the interests of all parties. Members of such a commission would then definitely know the particular rights affected by any proposed construction project and could attack condemnation and other specific problems with some hope of making progress.

The whole purpose of the present agitation for Colorado River development is, of course, to increase the quantity of water available for beneficial use. This quantity will be determined by the particular plan

adopted for the development of the stream. And this is one point at which the Compact of 1922 has proved entirely inadequate. No mention was made of particular projects. Let it be clearly understood that I do not say that more progress could have been made the past five years if the Compact had referred to definite engineering programs, for perhaps the plan worked out was as much of a forward step as could then be taken. But that it was inadequate, the last five years of inaction and controversy abundantly establish.

The Compact spoke of millions of acre-feet of water without a word about plans for making that water available. It attempted to tamper with the acknowledged system of water rights by asserting that the upper basin should have 75,000,000 acre-feet for use within the upper basin during each ten-year period, and that a like quantity, increased by a million acre-feet per year, should be available for use in the lower basin during each ten-year period.

But to declare that water shall be used in certain quantities in designated places does not make the water available for such use. This was realized by California when the legislature of that state attempted to couple a tangible project—Boulder Dam, contemplated by the Swing-Johnson bill—with assertions of the Compact concerning water rights. The manner in which the California legislature proceeded was to make construction of a storage reservoir in the lower basin a condition precedent to California's acceptance of the provisions of the Compact relative to the fixing of water rights. This action clearly shows that California appreciates the fact that an abstract statement concerning rights to water, which is not as a matter of fact available for use, is of little or no value.

The only interstate agreement which will finally gain sufficient support to result in ratification will be one, I believe, in which provision is made for engineering surveys to determine upon the best plan to make available the largest possible quantity of water and also to serve all other purposes of river development such as flood control and power generation. Coupled with these provisions there may very properly be a declaration of the manner in which rights to the water about to be made available may come into being.

In other words, when an inventory of all the water rights now existing on the Colorado shall have been made by an interstate commission, and when a survey of the most economic engineering plans for the development of the river shall have been completed, we will know how much water will be added to the present available supply. Knowing this, and knowing that the particular project determined upon for the development of the stream is the best and most economic method, the interstate commission could then undertake the next problem of suggesting the method or methods of creating legal rights to the water about to be made available. This portion of the work of the interstate commission might take the form of a suggested uniform water code for the interested states to be applicable only to the quantity of water made available by the completion of the engineering project finally selected.

The procedure outlined in the preceding paragraphs may seem to require too long a period of time before results could be realized. But those who have watched the situation during the past five years must be convinced that actual construction of Boulder Dam, the most widely heralded project on the Colorado, is now more uncertain than has been the case at any previous time

within the past five years. This is due to the fact that instead of making a survey of the whole river for the purpose of determining the best manner of developing it as an asset of the entire region, and therefore of the nation, greatest emphasis has centered around the question of the most feasible method of securing flood control for Imperial Valley and a water supply for southern California. And there are some who go to the extent of saying that plans now proposed for these specific purposes are not at all the most economical which might be devised to realize the desired ends.

Events of the past half decade clearly show that the most essential single thing for an interstate Colorado River commission to do is to provide a forum where the contentions of all parties may be submitted for consideration upon their merits. These contentions may relate to engineering, economic, or legal data. But whatever their nature, they should be available for scientific study and analysis by all interested parties. Had there been such an interstate commission in operation the past five years it is quite probable that the assertions of the Arizona High Line Association and of the sponsors of a gravity line from the mouth of the San Juan across southern Utah, across Nevada and California to the Imperial Valley, either would have been verified or exploded by the present time in a manner carrying conviction. As it is, these questions and a host of others of similar nature, to say nothing of the legal controversies, serve only to confuse the public.

CONTRACTING CONSERVANCY DISTRICTS

Assuming that an interstate compact between the seven states will some day provide for an interstate commission whose duties will approximate those above described, and assuming further that such commission will have completed the inventory of water rights existing prior to construction of any particular project on the Colorado and will have heard all arguments relative to the best engineering plan to be adopted, thus fostering an intelligent public opinion, and assuming further that such a commission also will have aided in working out the legal questions centering around the determination of water rights in the use of the additional quantity of water made available by the proposed new construction, the next step in Colorado River development should be the organization of conservancy districts to contract with each other relative to existing water rights and water rights which will be brought into existence by reason of the appropriation of water not now available but which will become available upon the construction of the engineering works finally believed to be the most desirable. In fostering the organization of these districts in the interested states an interstate commission would have an important part to play.

The general plan of organization of these districts might be similar to that of the conservancy districts of Ohio and New Mexico. These districts, analogous in some respects to irrigation and drainage districts of the various states, permit a large degree of local control of the coöperative enterprise. The primary purpose of the legislative act of Ohio is to provide a means whereby the owners of property in areas threatened by floods may organize for their mutual protection. However, this act [2] also states that its purposes include that of "providing for irrigation where it may be needed." New Mexico's statute,[3] as might be

[2] 104 Ohio Laws 13–64, February 5, 1914.

[3] Laws of New Mexico, 1923, Chapter 140, pp. 211–278, March 12, 1923.

expected, places more emphasis upon the reclamation features of the conservation program, though provision is also made for meeting flood dangers.

In other words, both Ohio and New Mexico have provided a method by which the owners of the land affected by a particular project may determine the manner in which that project shall be controlled and administered. This manner of dealing with the problem conserves the benefits of local self-government. By means of the organization of a number of conservancy districts in the states of the Colorado Basin, the groundwork would be laid for a series of contracts among such districts with respect to definitely determined water rights. But before these districts can be organized, the route of the main aqueducts which will eventually constitute the best unified system of development to serve the largest number of interests or purposes in the entire basin must be determined. Only in this manner will it be possible to know the areas which will be directly affected by the development and therefore included within the proposed conservancy districts.

Looking more closely at the language of the New Mexico Act we find that it provides that the district court sitting in and for any county of the state, or any judge thereof in vacation, is vested with jurisdiction to establish conservancy districts. These districts may be entirely within or partly within and partly without the judicial district in which said court is located. A partial list of the purposes for which the conservancy districts may be formed is as follows: preventing floods; regulating stream channels by changing, widening and deepening the same; regulating the flow of streams; constructing irrigation and drainage works or systems; coöperating and contracting with the federal or any state government to promote the agricultural resources and marketing facilities of the district.

The manner of organizing the district is by petition filed in the office of the clerk of the court vested with jurisdiction. Such petition is to be signed by one hundred owners of land or by a majority of the owners of land situate within the limits of the territory proposed to be organized into a district. In the event that private or public corporations own lands within the proposed district, such corporations are proper parties to sign the petition. Moreover, any city interested in some degree in the improvement, upon proper action by its governing body, may alone file the petition already mentioned. Following the hearing of any protests against the organization of the district, the court is to declare the district organized and give it a corporate name by which it is thereafter to be known.

The remaining articles of the New Mexico Act refer to the powers and duties of the board of directors of the conservancy district, appraisals of benefits, and financial administration.

Upon the organization of these conservancy districts in the states interested in the development of the Colorado the way would be cleared for a series of contracts between the various districts as parties, by which to determine the details of the use to which available water might be placed and the terms of remuneration for such use. Plans for the necessary construction work might also be handled by contract between the districts concerned.

In accordance with the Act of August 11, 1916,[4] conservancy statutes of the kind suggested would also be applicable to the public lands of the United States lying within the conservancy district, upon the approval of

[4] Chapter 319, 39 Stat. 506.

the Secretary of the Interior and subject to certain exceptions mentioned in the act. Briefly stated, the purpose and effect of this statute is to empower the Secretary of the Interior, following the presentation of a proper application therefor, to investigate the plans and financial and physical resources of irrigation districts theretofore or thereafter organized pursuant to the law of any state, and, if he shall find and conclude that any such district has planned and is executing an altogether meritorious and feasible irrigation undertaking, to grant his approval of its plan and undertaking, provided a majority acreage thereof is not unentered land. Upon such approval and upon compliance by such districts with certain conditions in said act specifically set forth, all unentered public land and land which has been entered, but upon which final certificate has not issued, shall be amenable to the state laws governing the district to the same extent and upon like terms as are privately owned lands within said districts.

CONCLUSION

In conclusion it may be said that the Compact drafted at Santa Fe in 1922, which has been the subject of innumerable conferences since that date, will perhaps never be ratified by the seven states in its present form because of its failure to mention a specific engineering project to make additional water available. Its inadequacy in this respect creates a situation in which the upper states cannot allow any construction to proceed in the lower basin before the compact is ratified, and the lower states, particularly California, cannot afford to ratify until the support of the entire basin for storage facilities in the lower basin is guaranteed to the lower states. But an understanding of the present Compact and the discussions which have centered around it, are of the greatest importance if the fundamental issues which surround the Colorado are finally to be resolved into a unified plan of action.

As one observes the present situation he is led to inquire if the experience of the past five years has not shown that a new approach to the problem would be advisable. Instead of attempting to apportion the waters of the stream before a unified engineering plan has been worked out and accepted by the seven states, the United States and Mexico, why should there not be an interstate commission created by the use of the interstate compact clause of the Federal Constitution for the purpose of examining all proposed plans for the development of the river? By means of the discussion which would accompany such a process there is reason to believe that confidence would be developed so that every representative and senator from the interested states would be ready to vote for the particular project decided upon. To develop this confidence should be the first and fundamental purpose of an interstate commission. It does not seem possible to develop it by discussing rights to water which is not yet available for use. But if everyone believed that a specific engineering plan for the development of the entire river would get the maximum use out of the stream, a continuing interstate commission would have something upon which to proceed.

Engineering and Economic Features of the Boulder Dam

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ALTHOUGH the present agricultural and commercial development of the Colorado River has been accomplished during the past 75 years, practically four centuries have elapsed since the first white man gazed upon its waters. During these centuries, the information left by the diaries of the intrepid Padres and explorers from time to time have given brief mention of the high waters and terrific floods which prevented their crossings or fought them in their endeavors to sail up the Lower River below Yuma.

The Colorado River has a total length of approximately 1750 miles, a drainage area of 244,000 square miles and a total annual water supply of approximately 21,700,000 acre feet. The larger portion of this water is supplied by the melting snow from the summit of the Rocky Mountains in western Colorado and Wyoming, but an appreciable portion is also furnished by the drainage area below the junction of the Green with the Colorado, a section subjected at certain seasons to violent storms of short duration commonly known as cloud-bursts. The effect of these storms and of the fluctuation in the melting snows is indicated by the differences in the river flow, annual discharges as great as 26,000,000 acre feet and as low as 8,000,000 acre feet having been recorded at Yuma.

Magnitude of Floods

While records have indicated the low flow of the river at less than 1300 cubic feet per second or second feet, in flood season—May and June—the discharge at times is more than 200,000 second feet by actual measurement, and the flood of 1884 was estimated at 384,000 second feet. Marks left by high water at some time previous to known records would indicate a discharge greatly in excess of this figure and reaching possibly 500,000 second feet.

Silt

In addition, due to the flood characteristics and to the effect of heavy storms on a large portion of the area, as well as the soil and topography of the country through which it flows, the river carries a tremendous burden of silt estimated from direct measurements at approximately 113,000 acre feet, or more than 182,000,000 cubic yards per annum.

Imperial Valley

Originally the Gulf of California extended approximately 200 miles north of its present shores and 100 miles north of the present Mexican boundaries into southeastern California. The Colorado River, heavily laden with the silt brought from the upper regions, has, during the centuries, deposited its burden as it entered the Gulf from the east side, gradually forming a huge delta which, working its way across, finally separated entirely the upper portion from the Gulf proper. After the separation and due to the silt formation, the river swung to and fro, flowing first into the Gulf and

then into the inland lake. The long intervals of time between, however, permitted the removal of the water by evaporation until finally a basin-like valley, now known as the Imperial Valley, some 40 miles in width and 80 miles in length, with its lowest point approximately 250 feet below sea level, is the result.

Though, due to the very meagre annual rainfall, this valley was one of the worst sections of desert traversed by the early pioneers, an ample water supply will make possible the irrigation of approximately a million acres of land unexcelled in richness within the United States.

Some 25 years ago a group of men with keen vision and faith in their convictions sensed the possibilities of this land, and after tremendous effort were successful in constructing the necessary works to bring water from the Colorado River to irrigate a part of the Imperial Valley. Today the results of such foresight and enterprise are shown by 462,000 acres of land reclaimed and under cultivation, a population of over 60,000 people with several well-built cities and an assessed property valuation of over $100,000,000.

Other Reclamation Projects

On the Arizona side, directly east of the Imperial Valley, is an equally fertile section of approximately 110,000 acres known as the Yuma Valley, and in addition, at various locations on both sides of the Lower River, are several projects including the Parker Project, 110,000 acres; the Palo Verde Valley, 78,600 acres; the Mohave Valley, 34,000 acres and the Cibola Valley with 16,000 acres; all of which, immediately adjacent to the river banks, have been formed by the deposition of silt. This land is extremely fertile and in a climate productive to the best form of agricultural development.

Flood Menace and Damage

The achievement in reclaiming the Imperial Valley has not been lightly won. The Colorado River, flowing along the eastern rim of the valley, has deposited a large portion of its silt along its bed, raising the level nearly a foot per annum until the river now flows on top of a silt ridge 300 feet above the lowest point of the valley.

Protective works of the levee type have been constructed at great expense to prevent the waters of the Colorado from returning to the valley. These have proved inadequate, and in 1905 and 1906 the river breaking through flowed for 18 months into the valley, forming the present Salton Sea, and in addition not only destroyed a large amount of property and land but entailed an expense of some $4,000,000 before it was again controlled and confined to its banks. Prior to and including the year 1924, more than $10,000,000 was expended for flood protection alone, and this expense continues. Each year the people of the valley are called upon to spend large sums of money for the maintenance and repair, and also the raising and extension of these levees. In addition to these expenses the annual cost for the removal of silt from their irrigating ditches and from their lands is approximately $1,350,000.

Finally the silt-formed delta has reached a condition whereby the river is now filling the last available depression into which it is possible to be guided by the hand of man. When this depression is filled, estimated by various authorities from 5 to 15 years, it may be practically impossible to withhold the river against turning and again flowing into the Imperial Valley, destroying by flood the almost superhuman efforts of the past 25 years. A destruction differing from that of the

Mississippi floods in that the only way that the water could be removed would be by evaporation, necessarily taking many years for its accomplishment.

Both the Yuma and Palo Verde Projects have been also subjected to disastrous floods within the past 20 years, causing great damage to property and crops on each occasion, the last one causing over $2,000,000 damage to the Palo Verde Project alone. The Mohave Project, after large amounts had been expended for levees, was forced to abandon further work due to their inability to provide protection from the flood menace.

Mexican Situation

During the early development of the Imperial Valley the finances were limited. In order to reduce the first cost an agreement was entered into with the Republic of Mexico, whereby a canal could be constructed with its diversion within the United States but immediately passing for a distance of 60 miles through the Republic of Mexico before again returning across the boundary to the lands of the Imperial Valley. As the price for this concession by the Mexican Government, the American farmers were forced to agree that Mexican lands would be entitled to one-half the flow through the canal. With the present area under direct irrigation of 462,000 acres in the Imperial Valley and 217,000 acres in Mexico, the low flow of the river is inadequate for all. This was clearly shown in 1924, when the total flow in the river was below 1300 second feet and for 76 days every drop of water in the river was diverted. It is also apparent that under such conditions, if Mexico insists on her present plans of development and one-half of the water, then for each additional acre placed under cultivation in Mexico an acre in the Imperial Valley must return to desert conditions unless there is storage and regulation of the flood waters.

The extremely serious situation of Imperial Valley may be appreciated by pointing out that this canal forms the only possible source of water for not only irrigation but for domestic use, and if interfered with for only a week it would mean not only financial ruin by destruction of crops, but the entire population and all live stock would have to be removed from the valley.

Domestic Water

The phenomenal growth of Los Angeles and the coastal cities of Southern California since the war has resulted in such an increase in the consumption of water for domestic and commercial purposes that the limit of the available supply is dangerously close to complete absorption.

In 1906 the city of Los Angeles began construction of an aqueduct to bring water from the Sierra Nevada Mountains 250 miles away for the use of its inhabitants. At that time the population of the city was approximately 160,000. It was estimated that the aqueduct would supply a sufficient quantity of water for a population of 2,000,000 and at the rate of growth it would certainly last for many years before this population was reached. Today with a population of over 1,200,000 and with the rapid growth continuing, urgent haste is necessary in obtaining an additional source of supply. This same condition, due to the rapid increase in population, exists in the surrounding communities and cities now dependent upon the small streams available and the percolation of flood waters into the underground gravel, a supply rapidly approaching complete utilization.

With this urgent necessity in mind, these cities, including Los Angeles,

have made careful investigation as to the available sources of additional supply and find that the Colorado River furnishes the only source of sufficient magnitude to meet their necessities for an appreciable length of time. Filings have been made for the appropriation of 1500 second feet for domestic use in the cities above mentioned, and the formation of a metropolitan water district to finance the proposed $150,000,000 aqueduct project for carrying this water from the Colorado to the coastal plain cities has been formed. The city of Los Angeles has voted and expended nearly $2,000,000 on preliminary engineering rights of way.

Government Recognizes Necessity

Due to the magnitude of the project necessary to furnish relief from the flood menace and to provide the necessary storage and regulation of the flood waters as well as the large quantity of silt, appeal was made to the United States Government for assistance. That the problem demanded solution and immediate action by the Government was very clearly stated by Dr. Hubert Work, Secretary of the Interior, in his report to the Committee on Irrigation and Reclamation of the House of Representatives, on March 17, 1924, when he said:

> The Colorado River has been under observation, survey and study, and the subject of reports to Congress since the close of the Civil War. More than $350,000 have been expended by the Bureau of Reclamation since the Kinkaid Act of May 18, 1920. More than $2,000,000 have been expended by other agencies of the Government. The time has arrived when the Government should decide whether it will proceed to convert this natural menace into a national resource.

Government Plans for Relief

As indicated by the Secretary of the Interior in his report referred to above, the United States Government has expended large sums of money in an investigation looking toward the best solution of the problems comprising flood and silt control, storage and regulation of flood waters for irrigation and domestic uses. The first and preliminary report made public was the so-called Fall-Davis Report published as Senate Document 142, 67th Congress, 2nd Session. The latest and most comprehensive report is the Weymouth Report to the Secretary of the Interior dated February, 1924, together with the supplemental report of June, 1924. This report incorporates a careful analysis and study of the resources and possible development of the entire river below the junction of the Green and the Colorado River.

Complete development, under the comprehensive plan thus determined, of which the proposed Boulder Canyon Project is a part, will result in the minimum amount of water lost by evaporation from the storage reservoirs and the maximum amount of hydroelectric power equaling 6,800,000 horsepower of peak capacity. The report shows further, that the first logical step in the program and the one providing the maximum amount of relief in the immediate crisis would be the building of the proposed dam in the main stream of the Colorado at the lower site of the so-called Boulder Canyon Storage Project, approximately 30 miles east of Las Vegas, Nevada; the river at this point forming the boundary line between the states of Arizona and Nevada.

CHARACTER OF PROJECT

General Description

The Boulder Canyon storage location furnishes one of the most remarkable dam sites in the United States as the walls rise abruptly to a height of

approximately 1000 feet, forming a narrow gorge. The foundation rock is admirably suited in every way for the construction of such a structure. It also provides a natural reservoir site which could, if necessity should demand it at any future time, provide a storage capacity of perhaps twice that now contemplated. The present plan of the Reclamation Service calls for a dam 550 feet in height above the low water level of the river, which would impound in the storage reservoir approximately 26,000,000 acre feet of water. With bed rock of approximately 110 feet below the present low water of the river, the total height of the dam structure will be 660 feet, a material increase over the highest dam now in existence. The tentative design as prepared calls for a structure of the gravity type arched up stream, a length at the foundation of 275 feet at the present low water line and across the top of the dam of 1100 feet.

Although such a structure is a new adventure in magnitude of design, it is well to remember that the engineers of the Reclamation Service who will build the dam under Government plans have also designed and built not only more dams than any other organization in the United States but practically all of the larger ones. Careful investigation has been made as to the type of structure and estimates prepared on the cost for both rock fill and concrete designs.

Adequate spillways will be provided by means of tunnels through the rock wall on the Arizona side to a small side canyon which enters the river a short distance below the dam. The cost of a 550-foot dam complete is estimated to be $41,500,000 exclusive of interest during construction.

Hydro-Electric Power

The United States Reclamation Service, in its early conceptions of the plan for the proposed Boulder Canyon Project, realized that there would be incident to the Project an opportunity for the development of a large block of hydro-electric power. Investigations as to probable power market were made and resulted in ample assurance that conditions were such that there would be a market for the power and that the revenue from that source would be sufficient to repay the Federal Government for its total investment in the Project, over a period of years, with interest, and also the cost of operation and maintenance.

Accordingly, the Secretary of the Interior has caused to be written into the proposed legislation alternative methods of providing for revenue from the power. One plan contemplates that the Government itself build a power plant of approximately one million horsepower installed capacity. The average or firm horsepower, if generated continuously day and night through the year, would be approximately 550,000 horsepower, hence a one million horsepower generating plant would carry peak loads during the hours of heavy demand such that the average load would be 55 per cent of the peak; that is, the power would be developed on a 55 per cent load factor.

The investigations and reports referred to estimate the cost of the power plant to be $31,500,000, exclusive of interest during construction, and it is proposed that the Government sell the power at the switchboard of the power plant at a price that will cover the cost of operation and maintenance and the repayment to the Government of the cost of the storage and power project combined over a period of years, with interest. The plan, therefore, contemplates that the Federal Government would loan its credit but be fully reimbursed for its investment, with interest, and the proposed legisla-

tion requires the Secretary of the Interior to enter into firm contracts for power, sufficient to provide complete reimbursement to the Federal Government, before the expenditure of any money for the construction of the project.

Alternative Power Program

In order that the Secretary of the Interior, who would be directly responsible for the financial success of the undertaking, might be assured of every assistance in the working out of such a plan, the proposed legislation contemplates that he may, in lieu of selling the power at the switchboard, lease units in the Government constructed plant, or at his discretion lease the right to develop power by means of the water discharged from the dam to applicants who would then build, under Government supervision, their own plants for the development of hydro-electric power, thus relieving the Government of this portion of the investment. Proceeds from the sale of power rights would take the place of revenue from power and be used in the amortization of the cost of the dam structure and project.

All-American Canal

In addition to constructing the above-mentioned project at Boulder Canyon, and in order to relieve the Imperial Valley from its present dependence on Mexico, the plan contemplates the construction of a so-called All-American Canal, approximately 60 miles in length, which would lie entirely within the United States. In the plans for this canal it is proposed to move the point of diversion to the present Laguna Dam, some 12 miles above the city of Yuma. At the time this dam was constructed the Imperial Valley entered into a contract with the United States Government and agreed to pay and is paying for the privilege of this diversion $1,600,000 out of a total cost for the dam of $2,180,000. This will also enable the water to be taken out at a much higher level, making possible the irrigation at some future time of some 500,000 acres of additional land lying in the Imperial and Coachella Valleys.

A board appointed under an agreement between the Secretary of the Interior and the Board of Directors of the Imperial Irrigation District, composed of Dr. Elwood Mead, now Commissioner of Reclamation, C. E. Grunsky, consulting engineer of national reputation, and W. W. Schlecht, Engineer of the Reclamation Service, made a complete report including estimate on the cost of such canal, and also reported favorably as to its feasibility and desirability. In addition to this board, engineers of high standing have, with practical unanimity, after thorough investigation, endorsed the plan for such a canal.

The estimated cost of the all-American Canal is $31,000,000, exclusive of interest during construction. Although this appears large, the cost per acre for all construction charges as determined by the Secretary of the Interior including the present bonded indebtedness of the Imperial Irrigation District of $25.50 will be as follows:

Imperial Irrigation District.....	$66.00
New lands under All-American Canal	90.40

When these figures are contrasted with the average construction costs of present reclamation projects they show the reasonableness and feasibility of such a project from the cost standpoint.

While the urgency of this canal cannot be questioned, yet it must be considered that it is wholly infeasible without control of flood waters and the storage reservoir for the removal of silt and the regulation of flood waters according to an irrigation program.

The Secretary of the Interior at the request of Congress submitted a proposed plan of development financed through the sale of the hydro-electric power, including a 550-foot dam and a one million horsepower plant, together with the All-American Canal, as follows:

As to cost for:	
26,000,000 acre foot reservoir	$41,500,000
1,000,000 horse power development	31,500,000
All-American Canal	31,000,000
Interest during construction, 5 yrs. @ 4%	21,000,000
Total	$125,000,000
As to revenues—annual operation:	
Sale 3.6 billion kilowatt hours @ 3/10c	$10,800,000
Storage and delivery of water for irrigation and domestic purposes	1,500,000
Total	$12,300,000
As to annual fixed charges for operation and maintenance, storage and power	$700,000
Operation and maintenance, All-American Canal	500,000
Interest on $125,000,000 @ 4%	5,000,000
Total	$6,200,000
Estimated annual surplus or sufficient to repay the entire cost in 25 years	$6,100,000

From the above it is apparent that the proposed plan is absolutely feasible from a financial point of view.

SIGNIFICANCE TO THE SOUTHWEST

Agriculture

The controlling of the floods and the storage and regulation of these waters will permit of the ultimate irrigation of lands in the states of Nevada, Arizona and California totaling approximately 1,750,000 acres including lands already under irrigation.

As the available water supply of Southern California for irrigation purposes is practically exhausted, and with the rapidly growing population, it is evident that these additional lands will be required in the future along with a growing demand for farm products from other sections to feed the rapidly growing market of the Pacific Coast as well as the local markets in the states of Arizona and Nevada.

Manufacture

One of the most potent factors in the building up of an industrial community, and next to its supply of domestic water, is the ability to furnish its institutions cheap electric power. The construction of the dam will make available 1,000,000 horsepower of cheap hydro-electric power to the industrial markets of Arizona, Nevada and California, with its natural impetus toward increasing the production of present plants and the attraction of additional industries to the communities. Experience shows that as our population and industrial activity along our special lines increase our demand for food and manufactured articles from other parts of the country increases in even greater proportion.

Domestic Water

The storage of the flood waters and the removal of silt by the reservoir will furnish a supply of portable water for the cities of Southern California, and without which their growth must, at the present rate of increase, abruptly cease. It is, therefore, imperative that if the Southwest is to grow, additional water must be procured and the only available source is the Colorado River.

SIGNIFICANCE TO THE COUNTRY AS A WHOLE

The construction of the Boulder Canyon Project will have a decided bearing and significance to the country

at large as it will necessarily call for large quantities of construction material and equipment, practically all of which must be at present supplied from eastern markets. Large blocks of cheap power, permitting the growth of industry in the Southwest, will add materially to the shipment of commodities both raw and finished between the east and west.

As the land is placed under cultivation, in addition to supplying the local markets of the Southwest, due to the practically all-year growing season, it would be possible to ship to the eastern markets produce and staple vegetables at a time when they can be obtained from no other source in sufficient quantity except from foreign countries.

The construction of the All-American Canal and regulation by the storage reservoir will unquestionably stop Mexican interests from adding materially to land they now have under cultivation, which is practically all utilized in the growing of cotton. This cotton is grown in Mexico not only by cheap foreign labor but enters the American market to compete with American grown cotton. While it has been feared that Imperial Valley lands would be used for the growing of cotton it is found by experience that they are better suited both climatically and financially to the growing of vegetables and similar commodities, and as pointed out these will either be used locally or enter the eastern market at a time when eastern farmers could not possibly supply them, and, therefore, they will not interfere with the present farming industry. The development of new lands by irrigation necessarily will be slow and will not equal an equivalent of the growing markets of this section.

Problems of the Colorado River

Relative Advantages of the Boulder Site

By Arthur P. Davis
Chief Engineer and General Manager, East Bay Municipality District, Oakland, California

THE Colorado River is one of the large and important rivers of this country, but has a very fluctuating discharge, due to changing seasons and changing years. If completely regulated its magnitude is sufficient to furnish an ample domestic supply of water to all the inhabitants of the United States, and a considerable margin over. The low water flow of the river during the latter part of summer and autumn, is all utilized in irrigation, and the development has proceeded to a point where in the drier years there is a serious shortage of water during September and October for lands already under cultivation; but the spring and early summer furnish vast quantities of flood water that not only run to waste, but do great damage to lands along the banks of the river, and especially in the Imperial Valley, which being an interior basin, if flooded, would be permanently destroyed. The imminence of such destruction is the occasion of the urgency of this problem.

The problem of changing the Colorado River from a natural peril to a national asset, is mainly a problem of water storage. Reservoir sites of large capacity have been examined and found feasible on the upper tributaries of the Colorado, and while these can partially regulate these tributaries, and assist in their development, they are not large enough nor properly located for complete control and development of the river. The bulk of the storage capacity must be provided within or below the canyon region where it can intercept most of the entire flow of the basin. Otherwise, the waters will be largely wasted as at present, and continue to be a menace to the valleys on the lower river, which will probably be destroyed if regulation is not accomplished in the near future.

The only site of sufficient capacity and properly located to accomplish all these results is at Boulder Canyon, where it is feasible to construct a reservoir to any capacity from 20,000,000 to 45,000,000 acre feet, and while completely regulating the river at that point, at the same time will develop sufficient power to pay for itself. Aside from its paramount virtues in water regulation for irrigation and flood protection there is no other plan of development which will produce power so cheaply as a large reservoir in Boulder Canyon such as proposed.

Active Opposition

It was first vigorously asserted by the opponents of Boulder Canyon Reservoir that 600,000 horse power developed at Boulder Canyon could not be absorbed by the available market for power for twenty years, and that in the meantime the interest charges would accumulate to such an extent as to make the development prohibitive. Finally the matter was referred to Mr. L. S. Ready and Mr. H. G. Butler, who made a thorough

examination of the subject, and proved that if the Boulder Canyon power were immediately provided, the power developed would be absorbed within three or four years after it could be produced.

OTHER SCHEMES FATAL TO CHEAP POWER

Notwithstanding this authoritative finding, the opponents are still expressing doubts as to the wisdom of so large a development and repeating their former recommendations that the river should be developed by a series of small dams. As represented by actual schemes of construction submitted, five dams are proposed of heights, respectively 158 feet, 163, 194, 209, 223 and 225 feet, in portions of the canyon where much larger development would be far more economical. Such development would be fatal to cheap power.

In general, the power developed by means of a low dam in the Colorado Canyon is far more expensive per unit than the power produced by a high dam. In either case, the floods of the river must be controlled to permit the excavation of foundations, which are everywhere deep. These control works cost as much for a low dam as for a high dam. The same is true of the railroad which must be built to convey materials and machinery to the site, which is in any case, a heavy expense. This also is largely true of the great construction plant; while the production of power by a low dam would be less in proportion to the height of dam, due to the better regulating effect of the water by the wider pond produced by the high dam, and the fact that each reservoir must be provided with a margin for the rise and fall of floods, above its top without interfering with the next development above.

POWER 30 PER CENT CHEAPER AT BOULDER

Careful estimates of cost, based upon extensive surveys at the Boulder Canyon site, show that a dam 555 feet high, proposed, will develop power nearly 30 per cent cheaper per unit than a dam 50 feet lower.

A still lower dam would be similarly more expensive per unit of power produced and in varying degrees the same principle applies to the development of any power site in the canyon region within the limits of feasible height of construction. Under such a plan power development on the Colorado would be no longer a menace to the investments in future power sites in the Sierras, for it would make the cost of Boulder Canyon power about as great as that produced in the Sierras, and it is such development as this that may be expected if it is turned over to private exploitation. This would largely destroy the great natural asset which the Nation owns in the power possibilities of the canyons of the Colorado.

One criticism of the Boulder Canyon plan is that a high dam would produce so large a pond that the losses by evaporation would be excessive and that the reduction of the floods to a maximum of 40,000 cubic feet per second as proposed is not necessary, but that a reduction to 80,000 would do about as well. A fair summary of the argument is that it is unwise to store this water because the reservoir would lose part of it by evaporation, and that it is better to allow the floods to continue to flow to the sea unused and to fight them on the way by means of high levees and other expensive and perilous provisions.

DAM IN MOHAVE CANYON

The same authority proposes to substitute for the Boulder Canyon

storage, a reservoir in Mohave Canyon, which would have a much larger water surface and entail about 75 per cent more evaporation in proportion to water stored. It would also submerge the city of Needles, the large railroad hotel, round-house, machine shops, large icing plants, twenty-four miles of yard track and twenty miles of double track main line, and the length of the transcontinental railroad would be increased about three miles. It would require the reconstruction of a similar length of the Santa Fe Trail highway and two great bridges across the Colorado River. It would also submerge over 30,000 acres of excellent land in the Mohave Valley, susceptible of easy irrigation, after the river is controlled, which could not be replaced. It is true other areas could be irrigated with the same water, but these other areas can only be reached by expensive canals, long tunnels and high pumping lifts, which would cost $200 per acre, or more, for construction, and incur prohibitive prices for operation and maintenance. Such enterprises are not feasible now, and may never be, and while it is wise not to prejudice their future possibilities, the argument that they justify the destruction of rich bottom land along the river is untenable and destructive of natural resources.

The dam in Mohave Canyon that would entail all of this destruction would produce very little power because of lack of head. It would be the most expensive power site in the Colorado Canyon that is seriously proposed by anybody, being more than double the cost per horse power of the proposed development in Boulder Canyon, besides its enormous evaporation losses. Its construction would be a signal victory for anyone opposed to the development of cheap power on the Colorado.

GLENN CANYON PROJECT IMPRACTICABLE

The Boulder Canyon development has been antagonized by a proposition to build a large reservoir in Glenn Canyon in northeastern Arizona, nearly twice as far from the principal markets and much more expensive in construction. Estimates of relative costs show that the development of power in Glenn Canyon would be nearly twice as expensive per unit as in Boulder Canyon, and the cost of transmission to points of use would be fully twice as great. The Glenn Canyon Reservoir would not solve the flood control problem, because it would leave uncontrolled about 50,000 square miles of mountainous drainage between Glenn Canyon and Boulder Canyon, which would leave the flood menace very dangerous. The power produced, while much more expensive, would be less reliable, owing to the enormous length of transmission line through country remote from construction and maintenance facilities.

SALT DEPOSITS

One of the objections heard is the allegation that the Boulder Canyon Reservoir would be rendered unfit for irrigation or domestic use by reason of salt deposits that occur therein. This question was thoroughly investigated by an eminent geologist of the United States Geological Survey, who reported that the quantity of salt, as compared with the volume of water, was negligible, and that in any event a brief period of solution would so undermine the overlying earth that it would cave in and cover up the deposits before any injurious amount could be dissolved. All competent experts who have examined this subject are agreed with Professor Ransom in the above conclusions and their

opinions have been duly published and made available to the public.

One after another of the objections to the Boulder Canyon development have been met and refuted, but regularly they are reiterated or new objections are invented. It is hardly possible that the ingenuity of the objectors has been entirely exhausted, and the interests involved are too great to allow us to expect universal acquiescence in the plan proposed.

What the Boulder Dam Project Means to California and to the Nation

By Clyde L. Seavey
Member of the California State Railroad Commission

OUT of many years of investigation by responsible Federal agencies and as a result of probably the most exhaustive course of hearings before Congressional Committees ever accorded any work of internal improvement, the so-called Boulder Dam Project for a development of the lower Colorado River has taken definite form. It contemplates the construction by the Federal Government of a great dam on the Colorado where that river forms the boundary line between the states of Arizona and Nevada and where there is not only a remarkably fine site for a dam but where there is also an exceptionally advantageous reservoir site. Under the plans for this development the dam will be 550 feet in height and will create a reservoir with a capacity of 26,000,000 acre feet. The estimated cost of the dam is $41,000,000, which means a cost per acre foot of storage capacity of but $1.58.

The project also embraces the construction of what is termed "The All-American Canal," being a canal running from the river to the Imperial Valley in California and located entirely to the north of the international boundary line between Mexico and the United States. The estimated cost of this canal is $31,000,000. As this estimate was based upon price levels existing nearly ten years ago and was made before the advent of improved methods of excavating on a large scale, it may safely be said that the cost of this portion of the project will be substantially less than the estimated figure.

Why the Development

This development is a unified development and is intended to subserve a variety of purposes with the minimum of cost.

To understand these and the reasons why the development has taken the form it has, requires a general understanding of the characteristics of the Colorado River and of the Imperial Valley.

The river is one of great fluctuation in flow, both annual and seasonal. Sometimes it discharges as high as 25,000,000 acre feet of water in a single year. The next year its total discharge may be as low as 9,000,000 acre feet. The seasonal variation in rate of flow is even more pronounced, ranging from 200,000 cubic feet per second, when in flood, to as low as 1250 cubic feet during the low water season.

The river rises in the high mountains of Wyoming and Colorado. Its mouth is the Gulf of California. Melting snow and rainfall from the mountain ranges are the principal sources of the river's run-off. The lower portion of the Colorado River Basin is made up of hot arid plains of low altitude, broken by short mountain groups. The central portion consists of a high rocky plateau, through which the river flows in a series of deep and narrow gorges.

Centuries ago what is now the Imperial Valley was a portion of the north-

ern end of the Gulf of California. The river, as it runs through the canyon region, picks up a tremendous amount of silt or sediment. In volume, this amounts to over 100,000 acre feet each year. Gradually the deposit of this sediment built a delta across the Gulf of California. There was thus left a great inland sea which was gradually unwatered by the slow process of evaporation. In this great bowl in the desert there has been built up an irrigated area of over 450,000 acres, populated by some 60,000 people and known as Imperial Valley. This valley actually lies from 250 to 300 feet below the channel of the Colorado River. The river runs along the rim of the bowl, until it finds its way into the Gulf.

This brief statement of the existing physical conditions indicates a flood danger to the Imperial Valley region, the seriousness of which cannot be overestimated. In 1905 the Colorado River did break from its channel along the delta and flowed into Imperial Valley. By almost superhuman efforts the river was restored to its old channel and directed to the Gulf of California. Just when another break will occur no one knows. It is known that year by year as the river piles up its volume of silt along its varying channels across the delta the imminence of the break becomes greater and greater.

To all of the Government officials who have investigated the situation thus adverted to, it has been obvious that the solution of the flood problem lay in the construction of a regulating dam up the river where there might be found both an appropriate site for a dam and an appropriate site for a reservoir. Such a dam would intercept the flood waters of the river and permit of their being released at times when the channel could safely carry them to the Gulf of California. Perhaps even more important than this was the fact that such a dam would intercept the silt of the river and thus prevent the gradual filling up of any natural depressions across the delta by which the water of the river may be conducted to the Gulf.

Just as it was obvious that the construction of such a dam furnished the remedy for the flood menace to Imperial Valley, just so it was apparent that the expense of such a dam was beyond the ability of the Imperial Valley to undertake and was probably of such magnitude that the Congress of the United States would long hesitate to authorize it as a direct and unreimbursible outlay.

Out of this situation developed the idea of a unified development by which the dam and reservoir would be of sufficient size and capacity not only to provide for flood control but also for future irrigation requirements of the lower Colorado River Basin and to make possible a power development, thus providing sources for a full reimbursement to the government of the cost sustained.

After the plan of such a unified development had assumed rather definite form a new interest arose of far-reaching public importance and one which made the development an even sounder one in its financial aspect than it at first appeared.

Since the census of 1920 the city of Los Angeles and the other cities of the coastal plain of southern California have experienced a tremendous growth in population. At the same time these cities experienced a period of dry years, which demonstrated the inadequacy of their present sources of domestic water supply. These two circumstances coming together caused this section, having a population of probably not less than two millions of

people, to awaken to the imperative necessity of supplementing its existing sources of domestic water supply. Investigations indicated the only practical source of such an additional supply was the Colorado River. To secure such a supply involved not only the building of a great aqueduct over two hundred miles in length from the Colorado River to the coast and the pumping of water to an elevation of over twelve hundred feet, but it also necessitated large storage in the Colorado River in order that there might be sufficient water to supply the needs of the territory tributary to the river and the needs of the coastal plain cities for domestic water, and also to remove certain technical and engineering difficulties in the way of desilting the water to render it susceptible to being pumped the great elevation necessary and its use for domestic purposes. It happened that the Boulder Dam plan of development fitted in ideally with this plan of securing a domestic water supply for the coastal cities. The need of a large amount of hydroelectric power to pump this water over the mountain ranges to the cities on the coast greatly broadened the market available to absorb any power generated at the dam and removed all reasonable doubts as to there being an available market to absorb any power which might be developed.

At the present time the Imperial Valley secures its sole supply of domestic and irrigation water by means of a canal which starts at the Colorado River a few miles north of the international boundary line and then proceeds in a rough semicircle for about sixty miles through the Republic of Mexico before reëntering the valley and delivering water to the lands on the American side of the international line. There are some 800,000 acres of land in Mexico tributary to this canal, owned almost entirely by American capitalists, which has been developing more rapidly than has the Imperial Valley and under circumstances both unfair and detrimental to the interests of irrigationists in the United States. The very existence of such a canal extending through a foreign country is conducive to international inharmony and trouble. Furthermore, the rapidly increasing draft upon the water carried by this canal for irrigation in Mexico coming on top of increased irrigation uses in Colorado, Utah and Wyoming frequently leaves the Imperial Valley subject to serious water shortages. Provision of large storage on the Colorado River in the United States, with nothing more, would leave this great area of land in Mexico as the chief beneficiary of the development because of the increased water supply which would come from river regulation and which increased supply would be available to Mexican land before reaching the Imperial Valley. The All-American Canal not only will solve a vexatious international situation but will relieve Imperial Valley from danger of water shortage and, together with the control of the release of water from the dam and reservoir, will give the United States strategic control of the waters of the Colorado River so that Mexican interests will not be able, against the will of the United States, to lay the foundations of claims to an undue proportion of the waters of the river.

That this development means a great deal to California goes without saying. But what it means to California it means in a greater or less degree to Arizona and Nevada.

It means that the Imperial Valley, in southern California, a valley made up of a sturdy pioneer stock of Americans, will be freed from the ever present menace of destruction by flood.

Proportionally, it means as much to the people of Yuma, Arizona, where there is a National Reclamation project, because this section, too, is subject to the menace of the Colorado River floods.

It means that the Imperial Valley will be freed from its present intolerable condition of securing its sole supply of water from a canal running through a foreign country.

It means, too, that this valley will no longer be faced with the danger of a water shortage—a danger hardly less serious than that of destruction by flood, since in that desert country nothing can live without water.

It means that the flood and waste waters of the river will be conserved and made available for future irrigation development in California, Arizona and Nevada. While plans for such development are more advanced in California than in the other states, relatively the advantage to the other states will be greater.

It means that there will be made available a large block of dependable hydro-electric power urgently needed in California but which relatively will be of greater advantage to the states of Arizona and Nevada, because these states, generally speaking, are not in as advantageous a position as is California in respect to steam power.

It will open the way to the coastal plain cities of southern California, securing an additional and imperatively needed domestic water supply.

Under the plan of development, which contemplates the Government *either building power plants at the dam and selling power at the switchboard or leasing the fall of the water to applicants for the generation of power*, danger of a monopolization of the power resources of the lower Colorado River is forever safeguarded against, as the whole scheme contemplates that the power or power privileges will be divided amongst various applicants. A monopolization of the power of the lower Colorado would mean that the agency securing it would be in a position of dominance in the industrial and political life of the Southwest.

NATIONAL ADVANTAGES

While the Boulder Canyon development will be of tremendous benefit to California, Arizona and Nevada, it is a mistake to think of it as a matter of merely local consequence. Works of internal improvement must be accomplished in steps, and each step is usually of more immediate importance to the section in proximity to it than to other sections of the country. The taking over of the Cape Cod Canal by the Federal Government was of more immediate consequence to portions of New England than to the South or Middle West or the Pacific Coast. Improvement of the Mississippi has its immediate beneficial effect upon regions lying in the valley of that great river. The proposed St. Lawrence development affects one section of the country more directly than another.

The nation as a whole is interested in this development because, among other things, it solves a vexatious international situation. It is perfectly obvious that sooner or later the Colorado River will be developed. By reason of the fact that the canal serving Imperial Valley passes through Mexico, unless this development is shaped on sound lines Mexican lands will be the chief beneficiaries and claims and rights will be created which may prove in the future extremely detrimental to American interests. The plan of the Boulder Dam development will put the United States in control of the waters of an American river and insure that waters conserved by the development

may be used in this country rather than in a foreign country.

This project is the first step in the development of a great river having tremendous possibilities. If developed in the public interest and on sound lines it has tremendous potentialities for good to the Southwest. The consummation of the Boulder Dam project means that the river will be developed in the public interest. For example, it insures the use of the waters for river regulation and irrigation in preference to use for power generation. The importance of this in a section dependent upon water for its agricultural growth can hardly be overestimated.

ALL COSTS TO BE REFUNDED

Perhaps the most interesting feature of the development lies in the financial scheme upon which it is built. This represents a distinct departure from anything heretofore attempted. Thus far in the history of this country Federal internal improvements have represented either an unreimbursed outlay from the National Treasury or an advance of funds to be reimbursed without interest, as in the case of reclamation projects. Here there is to be a complete reimbursement with interest. Even more significant than this is the unusual requirement that before any work is undertaken or any expenditure made the development must be completely underwritten by its beneficiaries. Firm contracts for the storage and delivery of water for irrigation and for domestic use and for the purchase of power and power privileges must be secured by the Government in advance of construction. As various responsible agencies are eager to contract for water and for power, this development, if authorized, will be of assured and demonstrated financial integrity.

THE OBJECTORS

Unfortunately, a consideration on its merits of this great work of internal improvement is liable to be prevented by the bitter struggle which is now centering about it. Private power interests, desirous of securing for themselves a complete monopolization of the tremendous hydro-electric possibilities of the lower Colorado River, unhampered by obligations respecting river regulation and use of water for irrigation, have launched a determined attack upon this development because it means that power will not be monopolized and that the waters of the river are first dedicated to river regulation and irrigation. Men influential in the business and political life of the Southwest who own or control vast areas of land in Mexico are bitterly opposed to this development, because it stands in the way of their securing special advantage to their great holdings. Each of these interests would have the Government make an unreimbursed outlay of some $25,000,000 for a low flood control dam, for such a dam would leave the hydro-electric resources of the river open to acquisition by the power interests and would redound to the benefit of owners of land in Mexico, as it would eliminate an all-American canal and in a practical way insure increased deliveries of water at periods when water is now approaching the point of shortage.

On top of this the situation has been further complicated by a resuscitation by certain of the intermountain states of the old doctrine of states' rights, a doctrine which has been conveniently forgotten by them during the long period when they were securing extensive assistance from the Federal Government in reclamation projects. These states are invoking this doctrine as a ground or pretext for claiming large

revenue from the development of the river, claims which, if recognized, would render the whole project unsound from a financial standpoint.

The next few months will witness a bitter and dramatic struggle over this development, the outcome of which will afford an interesting indication of the ability or inability of the American people to develop one of its great natural resources in the public interest.

My Objections to the Boulder Dam Project

By Hon. E. O. Leatherwood
Congressman, Utah

I HAVE been asked to state why I am opposed to the Boulder Canyon Dam project as it is proposed to be authorized in what is known as the Swing-Johnson Bill before the Congress of the United States. I can answer the question in one sentence. It is dishonest, dangerous, unsound and unnecessary legislation.

It is dishonest because it is masquerading under false colors. It purports to be a flood control and reclamation project but is, in fact, a government-ownership power project, which only incidentally provides some, but inadequate, flood control, and which may, if agricultural conditions improve, at some future time result in some irrigation development.

It is dangerous in two large aspects: first, because it subverts the relation between the national and state governments in that it would subordinate to national control the state control over the waters of the streams within the borders of the states themselves, and it would establish the precedent for federal bureaucratic control over vital industrial resources of the states; second, it would establish the dangerous precedent that the federal government may, in carrying out a legitimate function, undertake a business enterprise having no relation to its legitimate function except that the business enterprise is undertaken in the hope that profits therefrom will enable the federal government to pay the expense of the legitimate function.

It is unsound in the legal theory upon which it is based, namely, that the federal government may, under the guise of doing one thing, do an entirely different thing. It is further unsound in its economic, engineering and financial bases. It represents a political solution of what is essentially an engineering problem.

It is unnecessary because the regulation of the flow of the Colorado River in its lower basin calls for an expenditure of no such magnitude, nor for the risk of the taxpayer's money in an expenditure for the production of electric power for which there is no adequate market either now or in a practical future period.

Let us proceed to discuss the proof of the foregoing assertions.

The Boulder Canyon Dam Bill Is Dishonest

This bill has been repeatedly represented by its authors on the floor of both Houses of Congress, as well as by that powerful chain of newspapers which propagandizes on its behalf, as a flood control bill for the protection of the Imperial Valley in California. The danger and distress of the Imperial Valley have been described in harrowing terms, and it is on this appeal to country-wide human sympathy for sixty thousand lives and thousands of homes in danger from the floods of the "torrential Colorado" that chief reliance has been placed to arouse popular support. The danger is represented as being an imminent one calling for immediate preventive action.

In the face of these assertions as to flood danger, the following are the facts: First, there is no danger to human life involved in this flood menace, and there is, indeed, no danger to property

in the ordinary understanding of danger from a flood. Whereas the ordinary river flood means the sudden inundation of large areas and the flooding out of farms and homes, the flood waters of the Colorado would, during the first few months of a flood, inundate no homes or farms in the United States, but would simply flow into the existing inland sea known as the Salton Sea and very gradually raise the level of that sea. The annual flood of the Colorado is caused by the melting snows and does not last for a longer period than three months. At the end of that period the river subsides to a flow at which, through the present equipment for fighting it, it could very probably be again controlled and rediverted from its flow into the Salton Sea. Three months' or even a year's flow of the Colorado into the Salton Sea would cause no substantial damage to property. It is, therefore, rank misrepresentation to picture the flood danger to Imperial Valley as the ordinarily understood flood danger from other rivers in the country.

A dam which will also provide the necessary storage for silt and for water for irrigation purposes can be constructed at a cost of not to exceed $15,000,000. Flood control alone, without storage, that is, through channel dredging and levee construction, can be provided at a cost not to exceed $6,000,000. The cost of the project to be authorized in the present Boulder Canyon Dam Bill is estimated at $125,000,000, and its probable cost will be double that amount. The storage required for flood control is estimated at from 4,000,000 to 8,000,000 acre feet. The storage provided for in this project is 26,000,000 acre feet. Here, then, we have a bill masquerading as a flood control bill in which nine-tenths of the expenditure and approximately 75 per cent of the storage are for purposes wholly other than flood control! To represent this as a flood control bill is as to honesty and accuracy on a par with the representation that the annual appropriation of the Interior Department is for the maintenance of national parks, because a fraction of the appropriation goes for that purpose.

It is not primarily either a flood control or irrigation project. These facts were pointed out as long ago as March, 1925, by the three Cabinet officers who passed upon the project and condemned it. I refer to Secretaries Weeks, Work and Wallace and to their letter of March 24, 1925.

We do not, however, have to rely upon the statements of opponents to establish this fact. As recently as September 29, 1927, in the leading press organ for the Boulder Dam Bill, it was stated editorially:

> A compelling reason for including the power feature is the domestic water situation in Southern California. Los Angeles and twenty-seven other cities are applicants for Colorado River water. They must draw upon this in the not distant future. They stand ready to pay for it. But the only way to get it is by pumping it, and for this operation the only possible source of sufficiently cheap power is Boulder Dam.
>
> It is true a high dam is not needed for flood control. But a high dam is needed to impound a domestic water supply and to generate the power to pump it.

The mask is now off. This is not a flood control or an irrigation project. It is a power project primarily designed for furnishing power and water to the city of Los Angeles. Upon these facts I submit again that the Boulder Canyon Dam Bill is dishonest.

THE PROPOSED LEGISLATION IS DANGEROUS

When I say that this legislation is dangerous I speak advisedly. State

autonomy, the right of states to control the development of economic resources within their borders, has never before in my experience been so seriously challenged as by this legislation. The threat is twofold; first, to take control over the development of the Colorado River, which river flows through seven western states; second, under the guise of carrying out a flood control project to enter into the conduct of a huge business enterprise within the states which will be subject to no state taxation or control, and to take over from the states the right to control the rates at which the manufactured product shall be sold and distributed within their borders.

With the first of these threats, that of taking over control of our western streams by the federal bureaucracy, we have been contending for more than two decades. In the face of decisions contrary to their contention by the United States Supreme Court and by other federal as well as state courts, the Bureau of Reclamation of the Department of the Interior has since its creation persistently asserted a control over the streams in the West which subordinates state authority and prohibits irrigation developments approved by state authorities from proceeding without the consent of this federal bureau. Perhaps the two outstanding bitter experiences which the western states have had in this regard with the federal bureau have been on the North Platte and the Rio Grande Rivers. In connection with the construction of the Pathfinder Dam on the North Platte and the Elephant Butte Dam on the Rio Grande, the Bureau of Reclamation caused the Secretary of the Interior to declare embargoes against developments authorized by the states on the headwaters of those rivers. The areas affected by the embargoes were ready for development, and citizens of the states were ready and eager to proceed with the developments. Delegation after delegation from the states importuned Congress and the bureau to give them relief against these embargoes, but nothing was done. The embargoes continued for a period of almost twenty-five years. One of them was then declared illegal and lifted, and the other is now ignored. Hence, without any authority from Congress, with no justification in law, and merely through the control over public lands and through a desire to exercise an arbitrary authority in an illegal manner, bureaucratic employees of the federal government have hindered and retarded the development within the states of Colorado, Wyoming, and New Mexico.

The legislation under discussion now proposes to turn over to the Bureau of Reclamation the Colorado River, and to authorize the construction by that bureau upon that river of the largest dam ever attempted in this country or in the world. In the light of experience on the Rio Grande and North Platte Rivers, those of us who live in states which must depend for most of their future development upon the water of the Colorado are keenly aware that we are here faced with a threat of future embargoes upon our state developments. An attempt was made to obviate this danger by negotiation of an agreement between the seven states in the Colorado River Basin, which, when approved by the federal government, would establish the rights of these states in the waters of the river, and at least to a reasonable degree protect against the menace with which we are now faced. That agreement, although drawn and approved by delegates from the various states, has failed of ratification by some of the states and is therefore not in effect.

It is now proposed by the authors of this bill, and with the apparent approval of the Director of the Reclamation Bureau, to attempt to proceed with the building of this dam without any such compact. Relying upon the argument that this project is an interstate matter with certain international complications, it is proposed that Congress should proceed without regard to the protests of the states and without regard to whether the states are protected in their future development. So far as protection against the menace of federal bureaucracy is concerned, we are therefore in the same position as were the States of Colorado, Wyoming and New Mexico in the cases of the developments on the Rio Grande and North Platte. So much for the first menace to state autonomy.

The second danger in this legislation is even more far-reaching and fundamental than is the menace to state control over water. It is a menace to state autonomy throughout the United States. It is a menace to every citizen in the conduct of his everyday business, because in it the hand of federal bureaucracy reaches out and removes from state control a gigantic unit in industry.

To enforce appreciation of this danger I must again point out that this proposed project is not primarily a flood control project but is primarily a hydro-electric power project of the first magnitude. People generally who have given any attention to the project have been misled by its proponents into the belief that it was primarily a flood control and irrigation project which would incidentally, and only incidentally, develop as a by-product a small amount of power which should be disposed of by the government as an incident to its operation of its flood control and irrigation projects. As evidence of this there is the argument repeatedly made by the proponents that this is not the first time the government has built a power plant, because the government has built and operated power plants in connection with other reclamation projects. It is true that the government has built some fifteen small power plants in connection with irrigation projects. The total cost of these plants is slightly more than $1,400,000, and the average cost is less than $100,000. In other words, the argument is now made that because as an incident to the development of other irrigation projects the government has built some small power plants to furnish settlers on the irrigation projects with electricity—plants whose total capacity for the entire fifteen is less than 30,000 horsepower and whose total cost is approximately $1,400,000—that the government has thereby established the precedent for going into the power business by building a dam and power plant primarily for power purposes, where flood control and irrigation are the by-products, this power project to cost at least $100,000,000 and probably twice that, and to have a capacity of 1,000,000 horsepower. This single plant would have more than thirty times the total capacity of the other fifteen plants and the cost of it would be at least forty times the total cost of the other fifteen plants. Secretaries Weeks, Work and Wallace, in their letter commenting upon the Boulder Dam project, stated these facts as follows:

> While the United States has heretofore constructed power developments in connection with irrigation projects, these developments have been merely incidental to the projects, have been of a few thousand horsepower only and have been primarily for use on the projects themselves. The construction of a reservoir having a capacity of some four to eight times the needs of

irrigation and flood control and of a power development twenty times in excess of the probable needs of the irrigated lands and adjacent communities is a complete departure from former policies.

This 1,000,000 horsepower hydro-electric plant would be several times larger than the Muscle Shoals plant. Aside from the Niagara Falls installation it would be the largest single hydro-electric development in the world. The power made available would exceed by 500,000,000 kilowatt hours annually the entire amount at present consumed in the only territory where this power could find even a partial market. This gigantic stride into the power business is to be made by the United States Government with money (more than $100,000,000) raised from the taxpayers of the United States as a whole, under the specious plea that by the sale of power the money expended will eventually be repaid to the United States Treasury. And for what purpose is this huge investment and business experiment to be made? Why, say its proponents, in order to provide flood control and possible future irrigation needs in the Imperial Valley of California. In other words, in order to provide flood control and water for irrigation which, if those needs were taken care of, could be accomplished at a cost not exceeding $15,000,000, it is proposed that the government invest an additional $100,000,000 more and go into the power business in the hope that by this additional investment and over a period of fifty years or more the government will recapture all of its expenditure.

Two facts of the first importance have been insufficiently emphasized in all of the discussion of this project. These facts are, first, the size of the project and the relation between the expenditure for the legitimate function of flood control as compared with the expenditure for the proposed new activity of the government in the power business; second, that a startling departure from former government policy is proposed, in that wherever it is possible to do so, the government may go into an entirely extraneous business unconnected with government functions, in order to attempt to repay the expenditure on the legitimate function; and that the government should do this regardless of the fact that the venture into business requires an expenditure of more than ten times the amount required if the government confined itself to its legitimate function.

Let us see where this departure from former government policies would lead us. Let us suppose that the government finds it necessary to build a storage warehouse for government property at a cost of a half million dollars, and located in some city in the United States; that local interests represent that there is need for another large department store in that city and urge that the government should not spend $500,000 outright when by spending an additional $10,000,000 the whole expenditure can be recovered. Popular clamor from that district for a huge government expenditure would be aroused, and we might expect all of the pressure that that community could muster would be exerted upon Congress to induce an appropriation of $10,000,000 to build not only the warehouse but the department store. The precedent for such a measure would be very clear and well established if the Boulder Dam Bill were a law. Or again, let us suppose that the government is required to provide $1,000,000 in storage tanks for the storage of oil from a government reserve, and that investigation discloses the possibility that an oil refinery in that district would be

acceptable. Again Congress would be importuned to provide $20,000,000 with which to build an oil refinery and carry on that business, and the argument would be made, using the Boulder Dam Bill as a precedent, that it is very unwise for the government to make an outright expenditure when by coupling with that expenditure a large venture into the business world the taxpayer might be saved the million dollars which would otherwise be spent for oil storage. It is true that the oil industry might object and protest against the government entering its field of business, but would not their protests be drowned in the great flood of oratory about a great oil trust which was, through selfish motives, endeavoring to prevent the conferring by the Congress of this great boon upon the common people? I can hear them now, pointing out in eloquent terms the fact that oil is a great natural resource provided by God Almighty for the benefit of the people as a whole, and that no oil trust representing billions of invested capital shall be permitted to tell the Government of the United States that it cannot establish oil refineries for the benefit of all the people. And with the precedent of the Boulder Dam Bill before them, the Congressmen who might doubt the wisdom of the move would be hard-pressed to find an argument which could not be answered by that precedent. When the Congress of the United States commits itself to the proposition that in order to provide $10,000,000 of flood control the government may go into business to the extent of $125,000,000 to $200,000,000, the barriers are down. In no state in the Union would any business be safe from government competition, handled by federal bureaucrats and financed by the United States Treasury, because in every state the government is carrying on some function to which a huge business enterprise could be linked under the argument that the carrying on of the business was necessary in order to pay the expense of the government function.

I say, therefore, that if there was ever legislation proposed which challenged the rights of the states of the Union, we have such a proposal presented in this bill. It is not only the control of the federal government over the greatest river in the Southwest which is here proposed; it is an entering wedge for the removal from state control of large units in every great industry within our borders. This is no mere incident. The size of this proposal and the relation between the government-in-business feature and the legitimate government function is such that it must challenge the attention of every citizen who will for a moment give serious consideration to this aspect of it.

The right to tax and to regulate in the interests of our citizens those enterprises affected with a large public interest which are located within our borders is of the essence of state sovereignty. It is fundamental to the welfare of our citizens that the bodies which regulate their activities be located within the state's borders where complaints can be registered and heard without delay, where the conditions peculiar to the locality will be understood and where the regulating bodies are responsive to these conditions. Once the principle of control, ownership or regulation of local state industries by a federal bureaucracy is established by a measure such as the one under discussion, then we have saddled upon our people a new policy in government which will destroy the very foundation of the one we now enjoy. A new era in the struggle to maintain the sovereignty and rights of

our states is apparently upon us, and, unless we are alert, organized minorities with their eyes upon the fat purse of Uncle Sam, and their ears deaf to warnings, will barter away our birthright.

THE PROPOSED LEGISLATION IS UNSOUND

This legislation is unsound in the legal justification for action by Congress and in the engineering and economic aspects.

The federal government has no right of authority over the Colorado River either as to the stream itself or the bed thereof, unless that authority can be found in the commerce clause of the United States Constitution. The federal government under the commerce clause has the right and power to make improvements upon a navigable river, and this authority can be exercised without regard to the consent of the states within the borders of which the river is located. The Colorado River is not now navigable in fact. In early pioneer days it was used for pioneer navigation. As has been pointed out by the government officials and engineers, this navigation has now been abandoned. Furthermore, there is no demand for its reinstatement. This legislation does not even purport to be for the purpose of improving navigation. On the contrary, the construction of the dam and the diversion of water as proposed in the bill would militate against navigation. The manifest and avowed purposes of the legislation are the development of power and the control of the river in the interests of irrigation and the prevention of floods. Assuming that an attempt were made to justify the erection of this dam and power plant under the commerce clause, it would be a clear case of an attempt on the part of Congress, under the pretext of executing one power, to accomplish an object not entrusted to the federal government. In the case of *McCulloch* vs. *Maryland*, 4 Wheat. 316, 423, it was pointed out by Justice Marshall that any such attempt would be held unconstitutional. He said in that connection:

> Should Congress, in the exercise of its power, adopt measures which are prohibited; or should Congress, under the pretext of executing its powers, pass laws for the accomplishments of objects not entrusted to the Government, it would become the painful duty of this tribunal, should a case requiring such a decision come before it, to say that such an act was not the law of the land.

The contention that Congress has the right to authorize this project on the theory that it has a duty to legislate for the reclamation of arid lands, or for the benefit of lands owned by the United States below the proposed structure, is not tenable. The Supreme Court has already definitely pronounced against any such authority. In the case of *Kansas* vs. *Colorado*, 206 U. S. 46, 51 L. Ed. 956, the Bureau of Reclamation made this contention, as stated by Justice Brewer in the following language:

> It rests its petition of intervention upon its alleged duty of legislating for the reclamation of arid lands; alleges that in or near the Arkansas River, as it runs through Kansas and Colorado, are large tracts of those lands; that the national government is itself the owner of many thousands of acres; that it has the right to make such legislative provision as, in its judgment, is needful for the reclamation of all these arid lands, and, for that purpose, to appropriate the accessible waters.

After pointing out that the Government of the United States was a government of enumerated powers, and that only the powers actually granted

in the Constitution could be exercised by Congress, the contention so made was denied. There was also considered in that case another argument, which is sometimes made in behalf of this bill: that since there is no other adequate power to carry out this improvement that the United States should undertake it. In connection with that point the Supreme Court said:

> But, as our national territory has been enlarged, we have within our borders extensive tracts of arid lands which ought to be reclaimed, and it may well be that no power is adequate for their reclamation other than that of the national government. But, if no such power has been granted, none can be exercised.

And finally in that case the court said:

> But it is useless to pursue the inquiry further in this direction. It is enough for the purposes of this case that each state has full jurisdiction over the lands within its borders, including the beds of streams and other waters.

A long list of cases theretofore decided by the Supreme Court is cited in support of the last statement.

In the light of this and other decisions of the United States Supreme Court the only sound conclusion which can be reached is that there is no legal basis for the proposed action by Congress. If the states within whose borders this river flows do not consent to its control by Congress, and do not consent to the construction of this structure which would give that control, then Congress has no authority whatever to authorize the Secretary of the Interior, or any other agent of the federal government, to undertake its construction. If, therefore, Congress should pass this bill, it would be doing a futile thing, and would be merely contributing to delay in the development of the river which it purports to be undertaking.

The Company Point of View Regarding Boulder Dam

By C. Wellington Koiner
District Manager, Southern California Edison Company

THERE has been considerable discussion concerning the company point of view, that is, the attitude taken by the electric utility companies, particularly in Southern California, regarding the building of the Boulder Dam on the Colorado River.

The company point of view regarding the Colorado River development, or the building of the Boulder Dam, is briefly and tersely set forth in the following statement of Mr. John B. Miller, President of the Southern California Edison Company, in his financial statement of October 31, 1926, to the 105,000 stockholders of the company at that time. It sets forth the position of the company direct to its stockholders, and therefore cannot be construed as propaganda or intended for anything but the presentation of the facts of the company's position to the stockholders of the company, and therefore any amount of elaboration by additional words, or reference to the project could not set forth the point of view of the company more plainly, or directly, than that of Mr. Miller, whose statement is quoted herewith, verbatim.

Mr. Miller's Statement

"We would like to see it cease to be made a football to be kicked around in the working out of petty political plans. The political plans are too infinitesimally unimportant—the quality of the electric service too vital. Why jeopardize the one with the other?"

These words, from the *Wichita Democrat*, refer to a situation in Kansas, but they are equally significant when applied to the Colorado River.

The Boulder Dam proposal for the use of government funds has reached such a stage as to make it seem possible that Congress may make the necessary appropriation to put the program through, as no other program carries such a great weight of political support.

As far back as 1921 I said, "If it is possible for the Secretary of the Interior to secure from Congress an appropriation sufficient to erect a dam on the Colorado River, which will equate the stream, remove the menace from flood and establish the necessary water for irrigation, I believe it would greatly facilitate the whole development."

I reaffirm this statement. Whether the government proceeds under the Boulder plan, or under a better plan, I have always advocated that the power be made available, by a general cooperative plan, to all distributing agencies in the Southwest both corporate and municipal, in proportion to their present and prospective power demands.

However, the Swing-Johnson Bill in its present form includes the unnecessary feature of government financing and construction of powerhouses as well as a dam, thus injecting the government into the power business.

Neither the government nor its tenants would be subject to regulation by the Federal Power Commission. The Congress of the United States, in the year 1920, after more than ten years of deliberation, created this Commission and adopted a statute controlling the development of water power upon public lands. This was, in fact, a declaration by Congress of the national policy regarding development of water power in the country.

The principal objection to the pending bill has centered around this feature and it is believed, therefore, that the bill will be amended—as has been recommended by Secretary Herbert Hoover—to remove this objection. Such an amendment would not interfere with any of the benefits sought nor with the repayment of the cost of the dam to the government. The bill in its amended form would provide that the government construct the dam and that power development be made under the provisions of the national law and be subject to regulation by the Federal Power Commission. Any agency—municipal or corporate—desiring to develop power at the dam would have the opportunity to apply to the Federal Power Commission for a license so to do.

"Steam shovels and not politics will build Boulder Dam," says Mr. Hoover.

Federal Water Rights in the Colorado River

By Ottamar Hamele
Former Chief Counsel, United States Reclamation Service

IT is a common saying of the arid West that no irrigator is so honest that he will not steal water in an emergency. Like most epigrams, this saying is not strictly true, but it emphasizes in a colorful way the high value placed upon that compound of hydrogen and oxygen, known to chemistry as H_2O, in the great desert regions of Uncle Sam's far-flung sunset domain. It also explains in a measure the many bitter quarrels, both between individuals and between sovereign states, carried on for years over claims to the use of the insufficient discharge of Western streams.

Notable among such conflicts between the states were the long fight by Kansas and Colorado relative to the waters of the Arkansas (*Kansas* v. *Colorado*, 206 U. S. 46), and the equally earnest contest between Wyoming and the Centennial State concerning the Laramie (*Wyoming* v. *Colorado*, 259 U. S. 419; 260 U. S. 1). Each of these battles was waged in the United States Supreme Court and was carried no further only for want of a higher appellate tribunal. In neither instance was either contender satisfied with the result.

By the Colorado River Compact, drafted in 1922 under the able guidance of Hon. Herbert Hoover, it was planned to eliminate some of the water controversy on the American Nile, through an agreement between seven states and the Federal Government, allocating rights to the use of the flow of that turbulent stream. However, after more than five years of heated discussion the proposed compact remains unratified.

The War of Western Water

This continuous War of Western Water is waged not only on the irrigation ditch, before the court, around the conference table, and through the channels of publicity, but also in the legislative hall. One of its major engagements is now being fought out in Congress over the proposal that the United States construct at Boulder Canyon on the Colorado, a great reservoir, for the fourfold purpose of controlling floods, irrigating lands, providing municipal water, and developing a huge block of electrical energy.

The enactment of the Swing-Johnson bill authorizing the building of the Boulder Canyon project probably would be followed by litigation. United States Senator Carl Hayden, speaking for the state of Arizona, has given notice that if the bill is passed Arizona will be compelled in self-defense to file a suit in the Supreme Court to restrain construction until the rights of that state in and to the Colorado River are determined. (*Congressional Digest*, February, 1927, p. 50.)

The silt-laden waters of this great stream are clearly not of the healing variety, and prospects for peace along its 1700 winding miles appear to be somewhat remote.

Any discussion of water rights on the Colorado River prepared for the consideration of the general reader, should be prefaced by a brief explana-

tion of the doctrine of prior appropriation which obtains under local law in all of the seven States touched by the basin of that river. These seven states are Wyoming, Colorado, Utah, Nevada, New Mexico, Arizona and California.

The riparian water law of the humid East has been abrogated in each of these states, except California, where both riparian and appropriation rights are recognized. Under the doctrine of prior appropriation, he who first applies water to beneficial use either upon riparian or nonriparian land, acquires a vested property right to such use superior to the claims of all subsequent users. Such rights are recognized in the order of initiation until all of the water of the stream, if unnavigable, is utilized, and may be enforced without reference to State lines. (*Wyoming* v. *Colorado, supra.*)

THE POSITION OF THE FEDERAL GOVERNMENT

What may be called the official position of the Federal Government relative to the ownership of unappropriated water flowing in the unnavigable streams of the arid west, including the Colorado River, is stated on page 39 of the Annual Report of the Attorney General, dated December 7, 1914, as follows:

> The department takes the position that in the arid and semiarid regions, where the legality of diverting and appropriating water for beneficial uses on nonriparian lands is generally established, the original right of the Government to appropriate surplus water for its own uses, particularly for the reclamation of its enormous holdings of arid lands, has not been surrendered by any act of Congress or divested by the mere creation of states into which those regions have now become incorporated.

This claim of the United States was briefed and argued in the case of *Wyoming* v. *Colorado, supra,* first by Solicitor General John W. Davis, and later by Solicitor General James M. Beck, but the point was not passed upon in that case.

With unimportant exceptions, the territory lying in the Colorado River basin was acquired by the United States from Mexico under the treaty of Guadalupe Hidalgo of February 2, 1848, 9 Stat. 928. By that convention the United States became the exclusive and absolute owner, both as a sovereign and as a proprietor, of all of said watershed, the right as a proprietor being subject only to vested individual rights and such Indian rights as might be recognized. This ownership necessarily included both the land and the water.

Article IV, Section 3, of the Constitution provides that—

> The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States.

This power to dispose of the public domain is defined by the Supreme Court in *Gibson* v. *Choteau,* 13 Wall. 92, 99, as follows:

> With respect to the public domain, the Constitution vests in Congress the power of disposition and of making all needful rules and regulations. That power is subject to no limitations. Congress has the absolute right to prescribe the times, the conditions and the mode of transferring this property or any part of it and to designate the persons to whom the transfer shall be made. No state legislation can interfere with this right or embarrass its exercise.

The public waters were a part of the public domain, were property of the United States within the meaning of the Constitution, and could be disposed of apart from the land. There are many decisions to that effect.

In *Cruse* v. *McCauley*, 96 Fed. 369, 373, the court states that—

As the United States owns the waters which are incidental to its lands, it can dispose of them separate from its lands if it chooses.

The Supreme Court of Oregon, in *Hough* v. *Porter*, 51 Ore. 318, says:

The water flowing over the public domain is a part thereof, and the general government may grant or otherwise dispose of its riparian interests separate from the rest of the estate.

The following language is used in *Howell* v. *Johnson*, 89 Fed. 556, 558:

Being the owner of these lands it (the United States) has the power to sell or dispose of any interests therein, or any part thereof. The water in an innavigable stream flowing over the public domain is a part thereof, and the National Government can sell or grant the same, or the use thereof, separate from the rest of the estate under such conditions as may seem to it proper.

It thus appears that the United States at one time had an ownership in the public waters of the Colorado River Basin, and that these waters were susceptible of disposition independently of the land in the same area. The question then arises: Has the Government transferred its rights in these waters?

THE GRANT OF FEDERAL WATERS

A search of the Acts of Congress will disclose but a single grant, which is contained in the Act of July 26, 1866, 14 Stat. 251, as supplemented by the Act of July 9, 1870, 16 Stat. 217. This grant was carried into the Revised Statutes as Sections 2339 and 2340, and later into Title 43, Section 661, of the United States Code, reading as follows:

Section 661. *Appropriation of waters on public lands; right of way for canals and ditches.*—Whenever, by priority of possession, rights to the use of water for mining, agriculture, manufacturing, or other purposes, have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same; and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed; but whenever any person, in the construction of any ditch or canal, injures or damages the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

All patents granted, or preemption or homesteads allowed, shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such water rights, as may have been acquired under or recognized by this section. (R. S. Sections 2339, 2340.)

This grant was made primarily for the purpose of protecting the investments made by early settlers in California, who, without authority, had appropriated and used land and water belonging to the United States, under local customs, laws, rules, and regulations. It has been held to be prospective in operation. (*Union M. & M. Co.* v. *Ferris*, 2 Sawy. 176, 24 Fed. Cas. No. 14,371.) The effect of this legislation clearly is that of a direct grant by the United States to the user of water where the latter is complying with the local laws, customs and statutes of the state within which the claim is made. The grant is limited to users of water; it does not run to a State or any other political body.

This grant has been somewhat amplified in the public land laws relating to the acquisition of water rights by individual appropriators, notably in the Desert Land Act of March 3, 1877, 19 Stat. 377, and in the National

Irrigation Act of June 17, 1902, 32 Stat. 388. But again, all of this legislation relates alone to rights acquired by the application of water to beneficial use. There has been no blanket transfer out of the Federal Government.

THE DESERT LAND ACT

It has been argued that the Desert Land Act, just referred to, made a "dedication" of Federal water to the states. The pertinent provision reads as follows:

> That the right to the use of water by the person so conducting the same, on or to any tract of desert land of six hundred and forty acres shall depend upon bona fide prior appropriation; and such right shall not exceed the amount of water actually appropriated and necessarily used for the purpose of irrigation and reclamation; and all surplus water over and above such actual appropriation and use, together with the water of all lakes, rivers, and other sources of water supply upon the public lands and not navigable, shall remain and be held free for the appropriation and use of the public for irrigation, mining, and manufacturing purposes subject to existing rights.

A brief examination of the quoted provision will show that it contains no grant to the states. They are not mentioned as would be the case if they were grantees. The act deals with individual appropriators as did the acts of 1866 and 1870. Congress lays down certain requirements of a water right, and speaks as would an owner regulating his own property.

A general transfer of Government property cannot be implied. A statute cannot be construed to affect any right of the United States in the absence of express language so providing. (*U. S.* v. *Oregon Co.*, 186 Fed. 861, 893; *Oregon R. R.* v. *Oregon Ry.*, 130 U. S. 1, 26; *Coosan* v *State*, 144 U. S. 550.)

Also, it has been urged that Federal grants of land have included a transfer of Federal water. The answer to this claim is that under the law of prior appropriation a grant of land from the Federal Government does not carry riparian rights. (*Coffin* v. *Left Hand Ditch Co.*, 6 Colo. 443; *Clark* v. *Ashley*, 34 Colo. 285.)

Again, it is argued that the admission of a state into the Union, under a constitution declaring water to be the property of the public subject to appropriation through state laws, constitutes a grant to the state of Federal water.

As has been shown, Congress alone has the power to dispose of public land and water, and a state constitution, even when supervised and ratified by Congress, is not an act of Congress. (*Coyle* v. *Smith*, 221 U. S. 559, 568; *Ex parte Webb*, 225 U. S. 663, 690.)

The Federal Constitution is a grant of powers, but state constitutions are limitations on power, not grants. The Supreme Court of Colorado, in *Packer* v. *People*, 8 Colo. 364, quotes with approval from Cooley on *Constitutional Limitations*, as to the nature of a state constitution, as follows:

> It is not the beginning of a community nor the origin of private rights. It is not the fountain of law nor the incipient state of Government. . . . It grants no rights to the people; but it is the creature of their power, the instrument of their convenience.

THE NATIONAL IRRIGATION ACT

It is further contended that Section 8 of the National Irrigation Act is a surrender of Federal water rights to the states. This section reads as follows:

> That nothing in this act shall be construed as affecting or intended to affect or to affect or to in any way interfere with the laws of any state or territory relating to the control, appropriation, use, or distribution of water used in irrigation, or

any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any state or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof: *Provided*, That the right to the use of water acquired under the provisions of this act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right.

The first clause of the quoted section is merely a restatement of the general policy of the Government as it appears in the acts of 1866 and 1870.

The second clause, to the effect that the Secretary of the Interior in carrying out the National Irrigation Act, is to proceed in conformity with state laws, is the usual Federal "conformity" provision, such as is found in the statutes concerning condemnation—a conformity with the laws of the state in so far as those laws do not interfere with the rights of the United States. It is significant that there is no provision in the National Irrigation Act requiring the Government to "appropriate" any water. The Secretary of the Interior is authorized by Sections 4 and 5 to sell the Government's water and by Section 7 to buy or condemn water rights, but nowhere in the act is it suggested that it is necessary for the United States to make an "appropriation."

The quoted section also provides that "nothing herein (in Section 8) shall in any way affect any right . . . of the Federal Government . . . in, to, or from any interstate stream or the waters thereof." The Colorado River is an interstate stream and therefore no right of the Federal Government therein held at the time of the passage of the National Irrigation Act in 1902 was affected by the section quoted.

This section further requires that the water rights acquired by individuals thereunder shall be appurtenant to the lands irrigated. This is a declaration of Government ownership and control of its waters, as this provision is contrary to the water law of several Western states, providing that water rights are not appurtenant to the land irrigated.

The point under consideration is admirably summed up by Mr. Kinney, one of the leading authorities on Western water law, as follows:

> Our conclusions upon this subject are, that the United States, as the original owner of all of the land on the public domain, was also the owner of all the waters of the natural streams and other bodies flowing thereon. By various Acts of Congress the United States has disposed of some of these waters under the Arid Region Doctrine of appropriation; and that the United States is still the owner of these waters, which have not been disposed of, regardless of the action of the state or territory wherein they are located. The right to the use of other of its waters has also vested in the individuals who have from time to time acquired tracts of lands from the Government bordering upon the streams, as a riparian right, in those states where those rights are permitted. It was left to the various states, as a matter of sovereignty or jurisdiction to prescribe how the title to the use of the waters might be acquired by individuals, in accordance with its local customs, laws, and decisions of the courts. When the local customs, laws, and decisions of the courts had been fully complied with by an individual seeking to acquire a water right the title to the same vested in the individual direct from the United States, and not from any state. 2 Kinney, Irrigation. (2d. ed.) Sec. 640.

From the foregoing it seems quite clear that the United States is still the owner of the unappropriated waters of the Colorado River, and may utilize them for public purposes without the consent or approval of

any of the seven states touched by the watershed of that stream.

SPECIAL AUTHORITY FOR CONSTRUCTION OF BOULDER DAM

As to the proposed Boulder Canyon development, there is a special reason why the state of Arizona, which is one of the principal objectors thereto, is not in a legal position to interfere with the same. That state entered the Union under an enabling act which expressly retained in the Federal Government the right to carry on operations of this character. The pertinent provisions of the law (Act of June 20, 1910, 36 Stat. 557, 570, 574, 575) are as follows:

That there be and are reserved to the United States, with full acquiescence of the state (Arizona) all rights and powers for the carrying out of the provisions by the United States of the act of Congress entitled "An Act appropriating the receipts from the sale and disposal of public lands in certain states and territories to the construction of irrigation works for the reclamation of arid lands," approved June seventeenth, nineteen hundred and two, and acts amendatory thereof or supplementary thereto, to the same extent as if said State had remained a Territory.

. . . . . .

. . . no lands (in Arizona) which are or shall be susceptible of irrigation under any projects now or hereafter completed or adopted by the United States under legislation for the reclamation of lands, or under any other project for the reclamation of lands, shall be sold at less than twenty-five dollars per acre: *Provided*, That said state, at the request of the Secretary of the Interior, shall from time to time relinquish such of its lands to the United States as at any time are needed for irrigation works in connection with any such Government project; and other lands in lieu thereof are hereby granted to said state, to be selected from lands of the character named and in the manner prescribed in section eleven of this act.

. . . . . .

There is hereby reserved to the United States and exempted from the operation of any and all grants made or confirmed by this act to said proposed state all land actually or prospectively valuable for the development of water powers or power for hydroelectric use or transmission and which shall be ascertained and designated by the Secretary of the Interior within five years after the proclamation of the President declaring the admission of the state; and no lands so reserved and excepted shall be subject to any disposition whatsoever by said state, and any conveyance or transfer of such land by said state or any officer thereof shall be absolutely null and void within the period above named; and in lieu of the land so reserved to the United States and excepted from the operation of any of said grants there be, and is hereby, granted to the proposed state an equal quantity of land to be selected from land of the character named and in the manner prescribed in section eleven of this act.

Attention is particularly directed to that clause which reserves to the United States all rights and powers for carrying out the provisions of the National Irrigation Act of June 17, 1902, under which the Boulder Canyon dam would be constructed, "to the same extent as if said state had remained a territory." Before statehood Congress has plenary power over a territory unlimited even by the restrictions of the Constitution. The right of Congress to reserve Federal waters cannot be denied. (*Winters* v. *United States*, 207 U. S. 564.) Congress may even annul an act of a territorial legislature or legislate direct for the local government. (*Brunswick First National Bank* v. *Yankton Co.*, 101 U. S. 129; *Baca* v. *Perez*, 8 N. M. 187, 42 Pac. 162.) Were Arizona still a territory no one would question the right of the United States to deal with the public land and water therein as Congress might direct. It seems to follow that because of the

reservations in the enabling act no one can successfully question it now. And it should be added that an Arizona appropriation of water, good in that state, is also good throughout the entire stream system. (*Wyoming* v. *Colorado, supra.*)

A full recognition of the rights of the Federal Government to the unappropriated water of the Colorado River, would lead to most admirable results. Because of the interstate character of this stream, a general control outside of the seven interested states is peculiarly desirable. The United States has no interest adverse to any state, and should be able to do justice to all. Through such a control, much long, expensive and unsatisfactory litigation, such as that involved in the eleven-year quarrrel between Wyoming and Colorado, heretofore referred to, could be avoided. Questions as to conflicting rights could be quickly and finally settled, with a view to protecting all interests of the basin, rather than those of a single state.

It is indeed to be regretted that a wise and understanding statesmanship did not definitely settle this question as to each state by clear, explicit provisions in an enabling act. That was done fairly well as to public land; it should have been done as to public water. Then a truly constructive result would have been achieved and the casualties in the War of Western Water would have been materially reduced.

The Boulder Canyon Project

By Hon. Hiram W. Johnson
United States Senator, California

THE Boulder Canyon project, now before the Congress of the United States in the Swing-Johnson bill, is without a doubt the greatest constructive project pending before Congress at this time, and indeed, the greatest constructive project of our generation. There is nothing comparable to it within our memories, save the construction of the Panama Canal. It is a project of national importance, not only because of its importance for the control of floods, the reclamation of land, the conserving of water for domestic use, but also because the great private power interests have elected to make this bill the focal point in the struggle to retain in private monopoly the development of power. Here will be developed electric energy in the amount of 550,000 firm horse power which the bill provides shall be available for all the people. But the gigantic power combine is determined that this power shall be for their monopoly alone and this is the real issue upon which the opposition to the Swing-Johnson bill is based.

The Swing-Johnson bill for the development of the Colorado River is the result of years of labor and research on the part of the best engineering minds of the country to produce a workable plan, just and fair to all interests and sections. It provides, first, flood control and river regulation; secondly, reclamation of a million or more acres now waste; thirdly, domestic water for the coastal cities of the southwest; fourthly, an all-American canal to the Imperial Valley upon American soil, solving the present intolerable international situation; and lastly, as a by-product of the plan, the generation of power, which will enable the project to pay for itself.

The Swing-Johnson Bill

The Swing-Johnson bill provides for the building of a dam at Boulder or Black Canyon on the boundary of Arizona and Nevada. It proposes at that point to erect a dam 550 feet in height—the highest dam that now exists in the world—in order to store there by virtue of that dam 26,000,000 acre feet of water, creating a lake that will extend back almost one hundred miles from the dam, thus regulating the flow of the river, thus controlling its floods, and making the Colorado River, the third largest in the United States, a servant to mankind and a servant to the territory through which it flows.

The estimated cost of the project, as given by the Secretary of the Interior in his report of January 12, 1926, recommending the authorization of this project, is $104,000,000. This estimate is not mere guesswork but the result of long and painstaking studies by the Interior Department, and consultation with some of the leading engineers of the nation in addition to those of the Reclamation Service. The figures compiled have in turn been carefully checked and rechecked by the engineers and experts of the Imperial Irrigation District and others interested in the project. The same engineers have also estimated that sale of power and the returns from water storage will return a gross annual revenue of $12,-

000,000, or a net annual surplus of 6,100,000, or sufficient to repay the ntire cost of the project with interest n twenty-five years.

The Swing-Johnson bill provides hat no work shall be begun on the roject nor any action be taken in egard to any water rights until the tates interested, or at least six of hem, have approved the Colorado iver compact. The states having n interest in the Colorado River levelopment are Wyoming, Colorado, Jtah, and New Mexico, the so-called Jpper Basin States, and Arizona, Nevada and California, the Lower Basin States.

The Colorado River compact is a ompact for the settlement of water ights on the Colorado River by inter-tate agreement and was signed by epresentatives of the seven states on November 24, 1922. All of the states xcept Arizona ratified the compact t that time. Later, in 1925, a six-tate ratification of the compact was uggested, and this was approved by he four Upper Basin States and Nevada. California approved the com-act under the six state plan with her pproval to become effective when egislation was enacted which would ide for a high storage dam at der Canyon. Such storage would ve and make available for use in ates below the vast quantities ood waters which now waste to he sea. Without this protection Cali-ornia felt that her rights to the water equired for her needs would not be afeguarded. Although the Swing-ohnson bill safeguards in every way he rights of the Upper Basin States o their share of the water, Utah during he last session of Congress withdrew er ratification of the compact. Ari-ona has consistently refused to ratify ny compact, basing her refusal on arious pretexts, but the most evident reason is the desire of the state of Arizona to secure a revenue from any development of the Colorado River, either in the form of taxation of the works or a royalty on any power generated. There is no quarrel with Arizona on the part of California in regard to the division of the water and many conferences between the commissioners of the two states have indicated that California is willing to go more than half way in giving Arizona a large share of the water of the river. During the last fall conferences of representatives of all of the states were held at Denver in an endeavor to reach an agreement for the distribution of water and power which would be agreeable to all states interested in the Colorado River development. No definite agreement was reached and the conference only served to make it more evident that this project is bigger than an inter-state project. It is a national project in which the Federal Government has a deep interest and it must be constructed and its product of water and power distributed under federal supervision. The Denver conferences have only emphasized this fact. This in brief is the Boulder Dam project and what the Swing-Johnson bill proposes to do in making it a reality.

THE SERVICE OF BOULDER DAM

The problem of flood control and river regulation is a pressing one and one whose early solution is necessary if the fertile valleys of the Imperial and Yuma are to be preserved. The Imperial Valley lies in the southeasterly portion of California. On the south it is bounded by the Mexican line. Its easterly edge is about forty miles west of the Colorado River. Centuries ago the Imperial Valley was the northerly end of the Gulf of California. The tremendous quantities of silt carried by the river gradually built a huge delta

or dam across the gulf completely cutting off the northern end. Evaporation gradually dried up this section and left, lying in the form of a huge bowl, what is now the Imperial Valley. Around the rim of this bowl from 100 to 350 feet above the cultivated and settled areas runs the Colorado River. The river is building up its channel higher and higher through the deposit of more than 100,000 acre feet of silt carried down by its sediment loaded waters annually. This means that levees must be raised higher and higher with greater costs and with increasing danger of failure. A break will mean the loss of all that has been built up in thirty years by the men and women who have reclaimed this region from the desert. Experts are agreed that, unless the floods are controlled and the silt eliminated, it is only a matter of a few years until levees will no longer hold the Colorado in its present channel; when the inevitable break will come and the waters turned into the Imperial Valley. Since the Valley has no outlet this means permanent inundation and destruction for all time of the millions of dollars in property as well as probable loss of human life. The Boulder Dam will forever end the flood menace of the lower river. The huge reservoir will catch and hold the flood waters until they can be released gradually at a rate the river channel can accommodate with safety. Silt now deposited in the lower reaches of the river, aggravating and to a large extent causing the flood danger, will be intercepted and held at the reservoir.

With the danger of flood removed and a regulated flow of the stream assured, but one more thing would be needed to assure the Imperial Valley of an adequate supply of irrigation water and continued development. That need is the all-American canal, provided by the Swing-Johnson bill. The present main canal which supplies the irrigation and domestic water for the Imperial Valley runs for sixty miles through Mexican territory. This canal is under the control of a Mexican corporation, subsidiary to the Imperial District, and subject to a contract with the Mexican government that gives to the landowners on the Mexican side of the boundary, one-half of the water flowing in the canal. As irrigation uses have increased in Mexico the water available for irrigation in the Valley during the period of the low flow of the river has grown less and less, as the Valley gets what water is left after the Mexican users have supplied their needs.

The building of the all-American canal as provided by the Swing-Johnson bill will put an end to the intolerable situation which now exists with the Imperial Valley water supply under Mexican control. The seriousness of the situation may be realized by the fact that, if the supply of water delivered by this canal were interfered with for only a period of a few days, Imperial Valley would not only be faced with financial ruin from the destruction of all crops but the people themselves would have to move from the Valley as no other source of water is available even for drinking purposes. If there were any difficulty with Mexico, the Mexicans could take possession of the present canal which is the jugular vein of the Imperial Valley. With one stick of dynamite one hundred million dollars worth of property and the homes of happiness of sixty thousand or more people could be destroyed.

Another important feature of the all-American canal is that it will assure the landowners of the Imperial Valley an abundant water supply at all times which will enable them to develop their

land to the fullest advantage. This they cannot do at present because of the first call on the water by the owners of lands in Mexico. This land owned by American capitalists is being cultivated with Oriental and other foreign labor in direct competition with the citizens of the United States on United States territory. These owners of Mexican land claim the right to receive water through the Imperial canal sufficient to irrigate an acreage in Mexico equal to that irrigated through that canal in the United States. The unregulated flow of the Colorado River will supply water for only about 600,000 acres, and there are now under cultivation 400,000 acres in the United States and 200,000 acres in Mexico. Hence, for every additional acre that is hereafter placed under cultivation in Mexico, an acre of land now under cultivation in the United States must return to the desert. With the Mexican acreage under cultivation showing a yearly increase, it can easily be seen that the situation is becoming more intolerable all the time.

Some objection has been voiced to this development that it will bring more land under cultivation in competition with lands now being cultivated in other parts of the nation, especially with the cotton growers of the South. The competition in cotton growing comes almost entirely from the Mexican side of the border. Long since the Imperial Valley farmers found they could secure much greater returns from diversified vegetable and fruit crops than from cotton, but on the Mexican side, with cheap labor, cotton is the crop on about ninety per cent of the land under cultivation. Continuance of the present condition, or the building of a purely storage dam without the all-American canal, will mean that the Mexican landowners will be among the greatest beneficiaries from the use of the waters of the Colorado and they will steadily increase their acreage in competition with staple American products such as cotton.

The all-American canal will be at sufficient elevation to carry water to additional land, mostly public, lying along the rim of the Imperial Valley and in the Coachella Valley. The Imperial Valley might well be called "America's hothouse," and from it are supplied to the nation at off season vegetables and small fruits of all kinds, none of which come in direct competition with any other community. Dates and other tropical fruits not grown elsewhere in the United States are also products of this rich section. For this reason any new land brought under cultivation by the all-American canal or by the development of the Colorado River will produce these same crops and add nothing to the farm problems of the nation.

The Swing-Johnson bill provides that all lands practicable of irrigation and reclamation by the irrigation works authorized shall be withdrawn from entry, and when the works are sufficiently constructed to permit the delivery of water the same shall be open to entry in tracts not exceeding 160 acres, with preferential right to persons who have served in the United States Army, Navy or Marine Corps. There are 166,900 acres known to be irrigable from the all-American canal which will be subject to such entry. In addition there will be considerable land in Arizona which will benefit by the increased water supply.

The construction of the high dam at Boulder Canyon will, incidentally, enable the cities of southern California, now threatened with a water shortage due to rapidly increasing population, to secure additional water supply for the domestic use of their inhabitants. The present sources of supply have

been exhausted and the Colorado River is the only available source for the present population of the southern California coastal belt of approximately two million. About 1500 second feet of water will be required to supply this need. The cities interested, headed by Los Angeles, have taken steps to form a metropolitan water district to handle the building of an acqueduct two hundred and sixty miles long from the Colorado River and to provide for the distribution of the water. They are prepared to spend $150,000,000 for this purpose and have already spent a considerable amount in preliminary work. The large storage proposed at Boulder Dam will impound the flood waters that now go to waste and provide an excess over irrigation needs sufficient to supply these requirements for domestic use. The storage of this water and its delivery to the cities will provide a revenue to the government from the project. The fact that it will be necessary to pump the water over a mountain range to southern California will also provide a market for much of the power generated at the dam.

OPPOSITION OF THE POWER MONOPOLY

We have here then the purposes to which the Swing-Johnson bill is dedicated and what will be accomplished by the completion of the Boulder Dam project—flood control and river regulation, reclamation of lands and the emancipation of American land from Mexican control by the building of the all-American canal, and providing domestic water for the cities of southern California. Surely there is nothing in this beneficial program to arouse the nation-wide opposition to the Boulder Dam project that is now making its appearance at every convention of a national character. But the Swing-Johnson bill, at the behest of the Secretary of the Interior, provides that the Secretary of the Interior be authorized in his discretion to construct power plants as part of the project and to sell power wholesale at the switchboard to municipal corporations, political subdivisions and private corporations. Or he may lease the water at the dam to various applicants for the generation of power. This is for the protection of the government in the financing of the dam; a guarantee that the government will be repaid for its cost.

For years the private power companies have had visions of the potential value of the Colorado River as a source of electric energy. They also saw the cities of the California southern coastal belt increasing in population and in industries, with ever increasing demand for power, and their plans for the future included an absolute monopoly of the power resources of the Colorado River. Then came the Boulder Dam project with its provision that the people themselves as represented by their municipalities or their irrigation districts would have the right to buy power direct from the switchboard at the dam or to build generating plants of their own using the stored water.

The rights of the people to secure the fruits of this great national resource did not enter into the plans of the power combine and there has now been mobilized to prevent it one of the most powerful lobbies that has ever been assembled at Washington. Over the nation is being spread a mighty flood of misleading and false propaganda against the Boulder Dam project. Every source of propaganda that is conceivable today is in operation against this monumental work. Every single kind of publication that can be utilized against the building of this dam is now utilized in every part of the United States. Under the name of the

Joint Committee of the National Utility Association of 420 Lexington Avenue, New York, representing, as one of its officials boasted during last session of Congress "an investment of $7,000,000,000 which does not propose to permit the Government to enter the power business at Boulder Dam," the power combine is making its battle against this project.

THE ACTUAL PROVISIONS AS TO POWER

What are the facts about the power provision of this bill? The facts are all in the record of the hearings before the committees of Congress. When the bill was before the committee on Irrigation and Reclamation in the Senate, as was usual, it was transmitted to the Secretary of the Interior, under whose jurisdiction it comes, for his comment, his amendments and his approval or disapproval. When the bill was thus submitted to the National Administration, it contained no provision for the construction, either optional or otherwise, by the Government, of a plant for generating electricity. On the 10th day of January, 1926, the Secretary of the Interior reported upon the bill to the Senate Committee and in this report the Secretary expressed opposition to the allotting of power privileges, as proposed in the Senate bill, and advocated the building of a unified power plant by the Federal Government as more efficient and cheaper resulting in the elimination of controversies between applicants and long delays in their adjustment. In detail he gave his views as follows:

> The building of a unified power plant by the Federal government in the place of allocating power privileges, as proposed in the bill, is regarded as more efficient and cheaper. It will obviate controversies between applicants and long delays in their adjustment. In the end, I believe, results will be superior to those under an allocation of privileges. The area for the location of separate power sites is restricted. Allotments would not be equal in value. Some allottees would therefore have an advantage over others. It would result in the creation of operation and administration controversies to be avoided and which a unified development would avert.

Thereafter, in accordance with the direction of the Secretary of the Interior, representing the administration, the bill was amended so that a permission was given to the United States government hereafter, if it saw fit, to construct a generating plant at the dam. This provision was an option, a permission, a mere right if in the discretion of the Secretary it might seem wise thereafter to construct a generating plant. With this amendment the bill received the hearty approval of the Secretary of the Interior and the Secretary of Commerce and the endorsement of the President of the United States. The Secretary was entirely right in his views and none can question either the wisdom or necessity for the particular provision.

It prevents the monopolization of the power resources of the Colorado River. Such monopolization by any private agency would dominate the industrial and political life of the Southwest. With the government in control of the development, and the power made available allocated to various agencies, the danger of monopolization of the power of the Colorado River is forever effectively removed.

Out of the insertion of this provision in the bill at the request of the Secretary of the Interior for the full protection of the government in the financing of the project and that all who might benefit from the generation of power might have equal rights, has come the terrific opposition now directed against the Swing-Johnson bill; the marshall-

ing of billions and the calling to arms of every adherent of industrial monopoly and corporate control of utilities.

THE MENACE OF THE POWER LOBBY

The United States Government must have neither option hereafter nor permission to exercise a discretion in the greatest undertaking since the Panama Canal. The power trust says so and in advance vetoes legislation. It challenges not only independence of congressmen and senators but challenges the very government itself. It not only puts its profits above a people's welfare but says a people's government must do likewise.

They cry that the "government is going into business," that it is competing with private ownership and investments on an unfair basis.

This is not really an issue of government ownership at all. It involves no transmission of power by the government, leasing only either of power at the switchboard or water for the purpose, as the Secretary of the Interior in the exercise of a wise discretion may decide. The power companies are unwilling to trust the Secretary of the Interior and the present administration and demand that no discretion shall be given them. They frankly say they fear the establishment of a precedent and that in relation to the last great natural resource of the nation, they will take no chances on its preservation for the people, but that it must be administered primarily for the hydro-electric power companies.

To accomplish their purpose they have gathered at Washington, representing the public utility organizations of the nation, this great lobby. They have the active aid of men like Samuel Insull, who controls the power utilities of the Middle West and who is charged with having gone so far as to purchase a United States senatorship on behalf of his monopoly. To all the stockholders of his companies has been sent a notice warning them of the dangers of the Boulder Dam project.

The situation is really the age-old struggle of those who hold that what God gives belongs to the people and those who hold that it belongs to the few. The issue has been made, and it must be met at this session of Congress by every self-respecting legislator, and by every man who believes that the government, dealing with its own, is superior to any private interest.

Muscle Shoals, Nitrogen and Farm Fertilizers

By R. O. E. Davis

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ONLY about twenty-five years ago, a warning was issued by Sir William Crookes that the world's supply of available nitrogen was running short and a method of fixing the uncombined nitrogen of the air should be devised if the world was not to suffer in its food supply. From that time much progress has been made until today serious consideration is being given as to the best methods of utilizing the nitrogen that is or may be made available. The use as fertilizer is believed to be the field for the largest consumption of nitrogen. No longer is there any doubt as to the possibility of fixing nitrogen; the problems now are connected largely with commercial development and with the utilization of the fixed nitrogen products, even though great improvements may be made in nitrogen fixation processes. In discussing the subject indicated by the title, it is therefore necessary to trace somewhat the development of the methods of fixing nitrogen and outline to some extent the changes that have come about since the question of Muscle Shoals was first presented and also the tendencies of the nitrogen fixation industry.

Nitrogen in Nature

Nitrogen occurs in nature in largest amount as uncombined gas in the atmosphere, of which it constitutes about four-fifths by volume. It is also a constituent of mineral deposits, the principal one of which is the Chilean nitrate beds; it occurs in coal, in animal and vegetable residues and in the living tissues. It is indispensible to animal and vegetable life, just as essential as carbon, hydrogen or oxygen. And yet neither animals nor plants can utilize directly the nitrogen of the atmosphere. There is a natural cycle which roughly may be indicated as free nitrogen entering into combination through the agency of bacteria or under the influence of electric discharges, these combinations entering the plant and being transferred from plant to animal and finally through bacterial agencies returning again to free nitrogen, or remaining in the soil in accumulations under certain conditions.

An element so essential in life processes, when applied in assimiliable and suitable form to the soil results in greatly stimulating plant growth and thus becomes important as a fertilizer. An interesting estimate or what may be more accurately called a speculation, has been made concerning the annual losses of nitrogen by Dr. J. G. Lipman of the New Jersey Experiment Station. This loss of nitrogen from all land under cultivation in the United States is stated as between 3,000,000 and 4,000,000 tons, after due account is taken of the amount returned to the soil by manures, by leguminous crops, by atmospheric precipitation as rain or snow, and by the application of commercial fertilizers. This amount of nitrogen is equivalent to 15 to 20 million tons of ammonium sulphate or of nearly 200 million tons of ordinary mixed fertilizer. Part of this loss would occur under natural conditions, but

part of it is brought about through cultivation with resulting increase in leaching and more rapid oxidation of soil organic material. These losses may be decreased by the conservation of natural sources, or the employment of certain crops or rotations to increase the natural supply. The employment of better means of preventing soil erosion or leaching will add materially to the nitrogen conserved. The better use of green manures, and plant residues, the better conservation of animal manures, and the maintenance of soils in a condition suitable for the growth of nitrogen-fixing organisms will all contribute toward increasing the supply of nitrogen available. After all these resources have been utilized to the fullest extent, however, there will still remain a deficit of available nitrogen which must be met at some future time. There is no source capable of meeting the ultimate demand except the atmosphere. With most of the better agricultural lands already under cultivation, the world must in the future look to increased production to feed the increasing population of the world. There are many factors involved in bringing about increased production, but not the least of these is the application of commercial fertilizers.

There will probably be immediate objection to increasing the production of farm products, but this objection holds only at present as to total production. Increasing the yields per acre and making the labor more efficient is not objectionable, for it means cheaper production costs, and the release of labor for other useful work. And this is just what can be accomplished with the application of fertilizers. In general the farmer may raise with less labor and on less land the same amount of crop with the application of fertilizers that he does with more labor and on more land without fertilizer; and the cost of the fertilizer does not by any means equal the increased value of his crop. There are exceptions to this, but as a general rule, the use of fertilizers on soils of humid regions is profitable.

SOURCE OF NITROGENOUS MATERIALS

It has just been stated that the only source of nitrogen capable of meeting the ultimate demand for agricultural purposes is the atmosphere, but in order to understand the situation we should give some attention to the other sources of nitrogen. The first and most important supply of nitrogen has been sodium nitrate derived almost exclusively from the Chilean deposits. This supply is already beginning to feel very keenly the competition of the fixed nitrogen from the air. While undoubtedly it will continue for a long time to be an important material, the decreasing production and use of Chilean nitrate has already begun.

The second source of importance is ammonium sulphate derived as a by-product from coke ovens and gas plants. With our present methods of manufacture of pig iron, it is most likely that the production of this material will not decrease. That there may not be the great increase anticipated in some quarters by the increasing demand for coke for domestic purposes is possible, but the commercial development of methods of producing liquid fuel from coal may ultimately increase the supply of ammonium sulphate. This industry can hardly be said to be in its infancy yet, but its development may so influence the fuel industry and incidentally the ammonium sulphate supply that its effects cannot be foretold at present.

In addition to these two larger sources of nitrogen, there are many smaller ones, mostly of organic materials, such as cottonseed meal, slaughter-

house tankage and waste products such as dried blood, fish scrap, garbage tankage and other minor materials. Much of these materials has been and is being lost to fertilizers and is going into feed stuffs because of their higher value in this field.

ATMOSPHERIC NITROGEN FIXATION PROCESSES

A survey of existing sources of materials aside from nitrogen fixation processes shows that the prospects of enormously increasing production is not likely and for the future the increased demand must be met from the atmospheric nitrogen. This has been recognized for nearly thirty years and investigations on methods of nitrogen fixation have been stimulated to meet the demand. The World War, however, furnished the greatest impetus to the development of the fixation industry.

The three types of processes that have attracted most attention in the development of the nitrogen fixation industry are known as the arc, cyanamide, and direct synthetic-ammonia processes. The first of these is based on the most obvious method of fixing nitrogen, that is bringing about the combination of the nitrogen and the oxygen of the air and absorbing the nitrogen oxides produced in water to form nitric acid. This combination is effected by the passage of an electric arc through the air. The energy consumed per unit of nitrogen fixed is very high and so the process is applicable only where power is very cheap. The second or cyanamide method, which employs coal, coke, limestone and nitrogen from the air to produce a solid substance carrying about 22 per cent nitrogen, also requires much power, but only about one-fourth the amount per unit of nitrogen of that required for the arc process. It is sufficiently high, however, to demand comparatively cheap power for the successful operation of the process. The third or direct synthesis method, in which hydrogen and nitrogen combine under the influence of a catalyst to form ammonia, requires about one-fourth the power of the cyanamide process, and here a condition is reached where power is not so important a consideration in the process.

THE NITROGEN SITUATION AT THE BEGINNING OF THE WORLD WAR

The situation at the beginning of the World War was such that, while the world was familiar with the arc and the cyanamide processes for fixing nitrogen, Germany alone had developed the direct synthetic method on a commercial scale. The United States just before its entrance into the war realized that there should be some additional supplies of fixed nitrogen within the country. The demand for increased supplies was partially met by the increase in by-product ammonium sulphate from coke ovens. Even this was not sufficient, and in the National Defense Act of June 3, 1916, Congress made available for the President $20,000,000 for an "investigation of various methods for the production of nitrate and other products for munitions of war and useful in the manufacture of fertilizers." Investigations of conditions in this country and abroad resulted in a recommendation that the War Department take over the process of the General Chemical Company. This process was a modified form of the direct synthetic Haber process as practiced in Germany, but it had not been tried out on a commercial scale. Something had to be done, however, and the War Department erected Plant No. 1 at Sheffield, Ala., to test out the process. Only one unit of the plant was ever completed

and difficulties encountered in operation showed that the process part of the plant would have to be remodeled.

Almost immediately after it had been decided to erect Plant No. 1, it was realized that an additional source of nitrogen should be provided for by a well understood and dependable method and a contract was entered into with the American Cyanamid Company to erect Plant No. 2 at Muscle Shoals, Ala., with an annual capacity of 40,000 tons of fixed nitrogen. The plant was completed and a successful test run made just a short time before the signing of the Armistice.

The wisdom of building Plant No. 2 can hardly be questioned as the cyanamide method was the only one on which the information available was sufficient for successful and undoubted operation. The method had been in operation at Niagara Falls, Canada, for several years and there was no doubt that it could be relied upon to fix nitrogen.

THE PRESENT NITROGEN SITUATION

Conditions since the close of the war, however, have changed greatly. Beginning in 1915 the study of the direct synthetic ammonia process at the Arlington Farm laboratory of the Bureau of Soils, the United States Department of Agriculture made its facilities available to the War Department in 1918. This earlier work was augmented with the establishment of the Fixed Nitrogen Research Laboratory. The development of catalysts and the acquiring of additional information on the process has been followed by the establishment in this country of a number of relatively small direct synthetic ammonia plants, but at least two companies, Lazote, Inc., and the Atmospheric Nitrogen Corporation have sufficient backing to develop the process on a large scale as occasion demands. The development of nitrogen fixation in this country has been almost exclusively with the direct synthetic method. No cyanamide plant is operated in the United States; the plant at Niagara Falls is on the Canadian side. The arc process is operated at one location in the West where power is cheap.

The trend in this country is only indicative of the development of the direct synthetic process throughout the world. There has been a continuous increase in the amount of nitrogen products coming from the direct synthetic method. The world consumption of inorganic nitrogen for the year ending June 30, 1927 was 1,315,000 against 1,206,000 tons last year and 1,088,000 tons the year before. By-product ammonium sulphate supplied 310,000 tons against 300,000 last year and 275,000 the year before. Synthetic nitrogen in different forms supplied 734,000 tons against 583,000 tons last year, and 450,000 tons the year before. Consumption of Chilean nitrate was 271,000 tons of nitrogen against 323,000 tons last year and 363,000 tons the year before. This shows that the increase in nitrogen consumption is being met largely by nitrogen fixation processes. As an illustration of the rapid development of the direct synthetic proce[illegible] there were in the world in 1913, sev[illegible] arc plants of capacity of 19,800 tons of nitrogen per year, fifteen cyanamide plants of a capacity of 66,000 tons and one direct synthetic plant of 7,700 tons, while at the close of 1918, there were twelve arc plants of a capacity of 41,800 tons, thirty-five cyanamide plants of 357,500 tons capacity and three direct synthetic with 338,800 tons. There are in 1927, operating or building, seven arc plants of 46,200 tons, twenty-eight cyanamide plants of 313,500 tons and forty-nine plants for direct synthesis of 770,000 tons ca[illegible] pacity.

The trend of production of fixed nitrogen from the various sources may be seen from Table I, in which the total amount of nitrogen produced by atmospheric nitrogen fixation processes. The increasing relative importance of

TABLE I—WORLD PRODUCTION OF FIXED NITROGEN FROM VARIOUS SOURCES IN TONS

Sources	1913	1914	1920	1926
Chilean Nitrate	455,906	413,127	422,628	271,000
By-Product Ammonia	305,099	271,823	391,400	310,000
Cyanamide Process	35,838	44,035	130,000	174,000 [1]
Direct Synthetic Processes	6,798	13,596	297,000	519,450 [2]
Arc and Other Processes	19,800	23,000	42,130	40,550

[1] Total capacity of plants, 328,000 tons.

[2] Total capacity of plants, 724,000 tons.

world production for two years at the beginning of the World War and for 1920 and 1926 is shown. The production of Chilean nitrate shows a marked decrease for 1926, while that from direct synthetic methods is very greatly increased. The total estimated capacity of cyanamide plants in 1920 was about 325,000 tons, and for 1926 about 328,000 tons with a production in 1926 of 174,000 tons. Despite the difference between capacity and production of cyanamide plants, rapid construction of direct synthetic plants has taken place. The estimated capacity of these plants in 1920 was 311,000 tons, and in 1926 was 724,000 tons. The difference between capacity and production in these plants is mostly due to the construction of plants of such dimensions as to care for anticipated production in the near future.

In Table II are shown the percentages of nitrogen produced by the different fixation processes for the years 1913, 1914, 1920 and 1926, based on the

the direct synthetic methods and the decreasing importance of the other processes are clearly evident from these figures.

It may be readily inferred that the direct synthetic plants must possess some marked superiority over the other methods of nitrogen fixation. This superiority is mainly in the comparatively small amount of power required by the direct synthetic method, although the character of the product obtained offers some advantage.

The product obtained from the arc process is nitric acid. To make this available for fertilizer, it must be combined with some basic material and lime recommends itself as being cheap and suitable for addition to the soil. But the product, calcium nitrate, absorbs moisture and is a difficult material to handle because of the stickiness imparted when water is absorbed. This necessitates further treatment to overcome this undesirable property.

The product obtained from the cy-

TABLE II—PERCENTAGE OF TOTAL SYNTHETIC NITROGEN BY DIFFERENT PROCESSES

Processes	1913	1914	1920	1926
Cyanamide	57.4	54.6	27.8	23.7
Direct Synthetic	10.9	16.9	63.4	70.8
Arc and Other	31.7	28.5	8.8	5.5

anamide process is calcium cyanamide, a substance that can be used alone as a fertilizer under certain conditions with proper care. It is used thus in European countries on a rather extensive scale, but its use in this country has been in mixed fertilizer. It can be employed this way in only limited quantities in view of the fact that beyond a small proportion when mixed with acid phosphate it causes a reversion to insoluble phosphate. By additional treatment, however, other products may be obtained from cyanamide. Ammonia may be obtained by treatment with steam and the ammonia may be oxidized to form nitric acid. This nitric acid can be neutralized with an additional quantity of ammonia to form ammonium nitrate. Muscle Shoals Plant No. 2 is equipped to carry out all these operations. Ammonium nitrate is a desirable fertilizer material from the standpoint of nitrogen content as it contains about 35 per cent nitrogen, part as ammonia nitrogen and part as nitrate nitrogen. But it has the undesirable property of absorbing moisture from the air, so that special treatment is required for its use as fertilizer.

The product obtained from the direct synthetic process is ammonia, a gas at ordinary temperature and pressure. It is therefore necessary to combine it with some acid, or form some compound suitable for fertilizers. As ammonia may be derived from the cyanamide process as well as from the direct synthesis, the treatment may be similar from this point, or there may be a difference of treatment involving the use of carbon dioxide derived from purification of hydrogen in the direct synthesis method.

DEVELOPMENT OF NEW FERTILIZER MATERIALS

With the large production of ammonia from direct synthetic processes, studies have been made of the methods of utilizing the products as fertilizers, and many new forms of fertilizers have been suggested. Many of the compounds have been prepared and studied by the United States Department of Agriculture, but it is principally in Europe and especially in Germany that they have been produced on a commercial scale. If phosphoric acid can be produced cheaply, it may be used to combine directly with ammonia to form ammonium phosphate, a salt carrying both nitrogen and phosphorus and about 75 per cent of the weight as fertilizer constituents. Other products that it is possible to form, high in plant food constituents, are ammonium nitrate, calcium nitrate, potassium nitrate, urea, ammonium chloride, ammonium sulphate and potassium phosphate. By combinations of these it is possible to make fertilizer mixtures that contain the three principal fertilizer elements in varying amounts and in high concentrations. There are difficulties in the handling or keeping of some of the products, but methods of overcoming these difficulties are being rapidly developed, and it is probable that in the future with the increasing use of fertilizer and the decreasing production from the present sources of material, the strictly chemical fertilizer will form the basis of the fertilizer industry. This must await not only the development of the technology of manufacturing ammonia and phosphoric acid cheaply enough to compete with nitrogen and phosphorus in the present day fertilizer, derived from other sources, but must also await the education of the farmer to the use of new and unfamiliar materials. The most economical method must be employed to manufacture these materials and the history of nitrogen fixation shows the commercial displacement of the cyanamide process (the process of

Plant No. 2 at Muscle Shoals) by the direct synthetic process.

The manufacture of these new forms of fertilizer is dependent not only on the solution of technical problems, but on the economic situation. It is generally agreed that the development of the fertilizer industry is definitely toward concentrated materials. Definite knowledge must be available as to the properties and use of these materials before they will come into wide application. While the Department of Agriculture has been investigating the possible compounds suitable for fertilizers and the properties of these compounds and has tested their field application, there still remains very much to be done, before these concentrated fertilizers can be introduced into general practice in farming.

RELATION OF MUSCLE SHOALS PLANTS TO POWER

The association in the public mind of nitrogen fixation with power, and with fertilizers has led to the belief that the Muscle Shoals plants can be economically operated for the production of fertilizers because of the power available there. Nitrate Plant No. 2 at Muscle Shoals is a cyanamide plant and this method for fixation of nitrogen is already being rapidly displaced throughout the world by the direct synthetic methods. The consumption of power by the cyanamide process is about four times that of the synthetic processes. Plant No. 1 at Sheffield, based on the direct synthetic method, was designed for only one-fifth the capacity of Plant No. 2, and only a portion representing about one-fourth its capacity was ever completed sufficiently to make a test run. It was shown that this plant would have to be rebuilt to be operative. The cost of remodeling the plant would be considerable. In addition, the cost of power is not an important consideration in the operation of this process.

To operate Plant No. 2 at Muscle Shoals would be to utilize the power in fixing nitrogen by the process that is being rapidly displaced in the competitive markets of the world. To use the power for the operation of the direct synthetic process, it would be necessary to construct a plant based on the latest developments in this field, developments that have shown hydroelectric power unnecessary in its operation. The use of this power for the commercial operation of either process would be inadvisable, since it would employ it either in an uneconomic or an unnecessary manner and would prevent its utilization in processes where it is essential, or its distribution for industrial and domestic purposes. This is of real importance, for Muscle Shoals is so located that the demands upon its power, especially to the West and South, will undoubtedly increase.

Hydroelectric power is not necessary for nitrogen fixation by the direct synthesis method. This method employs the gases hydrogen and nitrogen and brings about their combination as ammonia under pressure, at a temperature of around 500° centigrade in the presence of a catalyst. In the first and largest plants of this sort, constructed in Germany, the hydrogen and nitrogen mixtures were prepared by the reaction of air and steam on coke in gas producers and purified before use for combination as ammonia. The principal power requirement is in the compression of the gases to several hundred atmospheres before they enter the reaction chamber, and this power can be obtained just as readily from coal as from water.

It is possible to obtain hydrogen from water by electrolysis and in this method electric power is necessary. However, the direct synthesis process

when operated with electrolytic hydrogen requires about 20 per cent more power than the cyanamide instead of 75 per cent less when chemical means of producing the hydrogen are used. Hence the electrolytic hydrogen is used principally where it is obtained as a by-product from an electrochemical process as in the manufacture of chlorine. There are a number of places where waste hydrogen is being produced as a by-product and this hydrogen may be utilized in the direct synthesis process.

The possibilities in the production of ammonia make the situation somewhat uncertain but show a definite drift toward the use of coal in producing hydrogen. This makes it unwise either to tie up for a long time any considerable amount of water power in a process that is being rapidly superceded, or in using it in a process in which power is of minor significance.

The fact that nitrogen fixation is more closely allied with coal than with hydroelectric power makes it more important for the economical development of the industry that the plants be close to coal producing centers. Such locations also have the advantage of distributing the nitrogen fixation plants and from the standpoint of fertilizer distribution would be an additional saving in freight rates over that due to the production of the more concentrated products already referred to.

THE SITUATION AT MUSCLE SHOALS

At Muscle Shoals there is a large water power available, developed for use in fixing nitrogen by a process that at the time was well understood and dependable. This process is now being rapidly displaced throughout the world by the direct synthetic methods, in which hydroelectric power is not necessary. The power not necessary for nitrogen fixation will find a market in the rapidly developing public utilities and industries of the region.

Of the two plants at Muscle Shoals, Plant No. 1 is of small capacity and will require reconstruction to be put in operative condition on a process for direct synthesis of ammonia, and Plant No. 2 is a complete cyanamide plant of 40,000 tons nitrogen capacity, built as a war-time necessity, but tending toward obsolescence because of the rapid development of direct synthetic methods. The present day development of nitrogen fixation does not require hydroelectric power. In fact the industry is more closely allied to the coal industry than to water power.

The commercial development of nitrogen fixation plants in this country is taking place rapidly as evidenced by the establishment of a number of direct synthetic plants, and the projection of plans for other plants by two of the largest chemical manufacturing concerns in the country. Large amounts of new types of fertilizers from the nitrogen fixation products will not be produced, however, until the market develops for these materials; and the market must be developed through a campaign of education regarding the properties and use of the new materials. It is inevitable that the use of fertilizers will increase and the area of use widen, also that, with the present sources limited, the concentrated chemical products will form the basis of the future fertilizer industry.

Plans for the utilization of Muscle Shoals have ranged from private lease and operation of the power and nitrogen fixation plants to government ownership and operation of both; and from the separation of power and nitrate plants under private operation to the sale of power, and the operation of the plants by the government for experimental and educational purposes in developing the new forms of ferti-

lizers. Whatever the solution of the problem is, it should take account of the ultimate demand for hydroelectric power in that region, the development of the nitrogen fixation industry in relation to power, and the development and introduction of the new fertilizer materials.

Nitrogen at Muscle Shoals

By Chester H. Gray
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IT is difficult to write regarding the Muscle Shoals project and confine oneself to the single aspect—nitrogen. This project has several truly national features which are from various points of view fully as important as is the nitrogen phase.

When Congress first authorized the location of a nitrogen fixation project and authorized the then President of the United States to make a selection of location for this project, there were at least four national characteristics thought of. At that time, the most important phase of the project, of course, was preparedness, or national defense. That aspect never, even in peace times, can be lost sight of. Then, taking second place in the category of national features connected with this project, was the production and distribution of fertilizers. It was then known, and has later come to be much better understood, that the same equipment down to a certain point in the process of manufacture which secures preparedness in the way of producing nitrogen, also makes it possible to secure fertilizers. A third feature which is connected with the Muscle Shoals project is that of river transportation. Too often, this aspect of the project is entirely lost sight of, but it is important enough in connection with the project to justify the statement that unless the Tennessee River is kept in mind throughout its navigable length as a transportation project, never can we expect the fullest development of fertilizer making at the Shoals.

The last feature and the least important from a national point of view is the power development at the Shoals. In the mind of Congress when the ordaining act was passed, power at Muscle Shoals was useful for one temporary purpose, only—that of preparedness, and for one permanent purpose, only—that of operating our preparedness and fertilizer factory in the locality of Muscle Shoals. Any separation of the power at Muscle Shoals from the preparedness and fertilizer aspects of the project is a departure from the ideas which evidently were in the Congressional mind when the soil was first broken at the construction period upon this project.

Unless one views, then, the Muscle Shoals undertaking in its broadest national way and from more than one point of view, it is difficult, if not impossible, to visualize its complete significance to our national life. It is an undertaking which in very direct ways in times of war or of peace brings rewards to each and every one of our citizens; but unless Congress views it in the broadest national way and from one point of view, it may lose its entire national significance and become nothing more than a power station such as can be found in many other localities elsewhere in the nation.

Type of Legislation Needed

The practical thing for us to do at this time, then, is to consider what type of legislation we should have in order to secure for our entire citizenship the four national characteristics above set out, namely, preparedness, fertilizers, river transportation, and power. In considering this practical legisla-

tive side of the question, we find three groups which are advocating three somewhat diametrically opposed points of view before Congress. These groups are: the farmers who want private operation under an iron-bound contract that certain specific things at the Shoals will be done. Then, we find the governmental operationists who want Uncle Sam to operate the entire project at Muscle Shoals, and secure by that method of operation whatever benefits can accrue from the project. Finally, we have the power interests which have, from the beginning and quite naturally, wanted to have the operation of the project under their control so that there would be no competitive power offered for sale in the Southern territory.

The controversy revolves around the question of the fixation of nitrogen and the making of fertilizers, of course. Sometimes, the transportation and the preparedness aspects are either neglected or utterly forgotten. Never, though, is the power aspect of the situation either neglected or forgotten. In fact, the controversy is, in some ways, more of a wrangle for power than it is an advocacy for preparedness and fertilizer making.

NITROGEN FIXATION

The first activity, though, which all ust consider at the Shoals if we want begin at the bottom is the fixation atmospheric nitrogen. Unless the oject is made to operate in the fixing nitrogen, the subsequent making of rtilizers cannot be expected and if he large national aspects of the projcts are forgotten, we may expect that the transportation feature will be allowed to fall by the wayside, also. But in the matter of nitrogen fixation, y hear much these days about procesŝes. In some ways, the arguments are made almost wholly in regard to the efficacy of the various processes for fixing atmospheric nitrogen. Truth to say, the Muscle Shoals enterprise has nothing to do with the quarrel as to which process is best or which is worst. In fixing atmospheric nitrogen at Muscle Shoals, we are faced with a business proposition more than a chemical and research one. Knowing that the cyanamid process will fix atmospheric nitrogen, the business proposition we necessarily must consider is this: Shall we junk the entire enterprise and let it degenerate into merely a power station, or shall we put the enterprise at work fixing nitrogen, first of all, and later manufacturing and distributing fertilizers?

Nitrogen fixation is comparatively, as all know, a new commercial undertaking. It is like most other business enterprises in that there is no one absolutely best method for fixing nitrogen. If there were some other process installed at Muscle Shoals than the cyanamid one, and if conditions for that other process, whatever it might be, were such as the process necessarily must have, then the business proposition facing us would be to make that process operative.

THE VARIOUS PROCESSES

The Muscle Shoals controversy now is not, when properly considered, a battle between and among the processes. More accurately, it is a battle for power, meaning whether the power shall be used to fix nitrogen and make fertilizers, or whether it should be distributed over transmission lines and sold at the prevailing kilowatt hour rates. It need not be maintained that the cyanamid process is greatly superior to any other known process, nor need it be asserted that any other process is so perfect as to eliminate every other method of nitrogen fixation. The so-called synthetic processes—the

most commonly known one being the Haber and modifications thereof—are good and undoubtedly are proving themselves efficient where conditions are advantageous to their operation. One such condition necessarily must be cheap coal. If a Haber plant should be located in the anthracite coal region of Pennsylvania where coal is high in price, one might reasonably state that it would be uneconomic in its production of fixed nitrogen. Such location would not be an argument to maintain that the Haber process is obsolete—to locate a Haber plant in such environment would merely be to place a good process in a bad location.

If the cyanamid plant at Muscle Shoals had been located at Des Moines, Iowa, where power is not cheap and not available in large quantities except at high prices, the plant built on this location would be, as we state, "a fish out of water." Such a location in the case of the cyanamid process would not demonstrate that the process is obsolete, but merely that it was disadvantageously located.

What is meant by the above statements, briefly, is that various processes are good, but that each of them must be placed where conditions are suitable for its operation. A condition of a Haber process plant is cheap coal; a condition of a cyanamid process plant is cheap power. Since, then, we have a cyanamid plant where cheap power can be made available, provided such power be not transmitted for other uses over long distances, we may conclude that it is advantageously situated and can be made to operate comparably to other cyanamid plants in other parts of the world where such plants are located close to the cheapest power known which is hydro-electric power. At this time, however, the cyanamid plant at Muscle Shoals is the only such plant in the world idle, owing to the Congressional inability to make up its mind what to do with the entire Muscle Shoals project.

Those who advocate the beginning of operations at Muscle Shoals at Nitrate Plant No. 2 cannot be said to be opponents of any other process for nitrogen fixation which is known. Such persons can, however, be said to commend the cyanamid process which is installed at the Shoals for operation under conditions which that process must have to operate successfully in any part of the world. All who advocate the beginning of operations at the Shoals in the fixing of nitrogen and the making of fertilizers want a "free field and no favors." Neither tariff duties nor opposition to the introduction of other fixation plants in our nation are being advocated as methods to protect the operations at the Shoals. Muscle Shoals, when it begins to operate, must meet world competition in fixing nitrogen and in making fertilizers. If it cannot meet this world competition, it will have been proven to be an uneconomic venture. Such a development would be true no matter what process might have been installed in the beginning at the Shoals.

Referring to obsolescence which is so much heard of now in connection with nitrogen fixation, it may be stated absolutely that the only process which is obsolete is the one which cannot meet world competition. Thus far, neither the Haber nor the cyanamid process has been proven in this method of definition obsolete, for they are at the present time meeting competition of the entire world and greatly extending the sale of products made by the two processes.

THE CYANAMID PROCESS

But applying ourselves for a while more specifically to the cyanamid process since it is more commonly said

to be obsolete and so described mostly by those who for various reasons do not care to see Muscle Shoals made operative except for power, let us see what the situation is relative to that process. Fifteen years ago, the total annual capacity of all the cyanamid plants in the world was only about 60,000 tons of cyanamid. Today, there are at least twenty-eight cyanamid plants all in operation in different parts of the world from which we have an annual tonnage of cyanamid somewhat in excess of 1,000,000 tons.

On the American continent, the fixation of domestic nitrogen began at Niagara Falls in Canada with an annual capacity of 5000 tons of cyanamid. The capacity of this plant has steadily grown until last year, 1925–26, the plant was producing at the rate of 120,000 tons of cyanamid per year. Down at Muscle Shoals we have a cyanamid plant about this same annual capacity which is, singularly, idle and alone in that regard among cyanamid plants anywhere in the world.

In a recent month this plant at Niagara Falls, Canada, produced 11,000 tons of crude cyanamid or at the rate of 132,000 tons per year. This monthly production was equivalent to 2500 tons of nitrogen or at the annual rate of approximately 30,000 tons per year. This does not look much like obsolesence when we make comparisons of the above mentioned amounts with our importations of Chilean nitrates.

Taking the world's production of cyanamid of 1,000,000 tons annually, and using the very low yield of 17 per cent of fixed nitrogen, this gives 170,000 tons of fixed nitrogen as the world's annual production at all cyanamid plants. Our importations of Chilean nitrates are about 1,000,000 tons annually, yielding approximately 15 per cent of nitrogen. This gives us from our importations of Chilean nitrates 150,000 tons of nitrogen annually. We see, then, that the fixed nitrogen produced at all cyanamid plants in the world is 20,000 tons in excess of our total importations, annually, from Chile. In view of these facts, it is hardly possible to maintain that the cyanamid process is obsolete, for to do so one had as well maintain that Chilean nitrates are likewise obsolete.

The nitrate plant No. 2 at Muscle Shoals is by common acceptance now capable of producing 50,000 tons of fixed nitrogen annually. Since Chilean nitrates yield about 15 per cent nitrogen and with agriculture in the United States using about 660,000 tons of the Chilean products, annually, we find that we are importing for agricultural purposes about 100,000 tons of nitrogen, annually, from Chile. Since the plant at Muscle Shoals has an annual capacity equal to half this amount, it is inaccurate to claim that the Government's cyanamid plant at Muscle Shoals is obsolete or should any longer remain idle. It is a neglect of the national defense of the country and a disregard of the needs of agriculture that the plant has remained idle as long as it has.

INCREASED USE OF CYANAMID

Another approach to the question of obsolescence in regard to the cyanamid process is a study of the increasing use of raw cyanamid in the world. For instance, we find in a report issued by the Chemical Division of the United States Bureau of Foreign and Domestic Commerce the information that in 1913 Italy consumed 15,000 metric tons of cyanamid. This consumption had risen in 1926 to 86,000 metric tons. The Commercial Attaché of the United States at Brussels, Belgium, reports that for 1926 30,000 tons of Chilean nitrate, 25,000 tons of sulphate of ammonia, 32,000 tons of cyanamid, 4000

tons of nitrate of lime, 2000 tons of guano were imported and used in Belgium. These figures show a total consumption of nitrogen in Belgium of approximately 16,000 tons. Assuming that the 32,000 tons of cyanamid was of a reasonably high efficiency and carried 20 per cent of nitrogen, we find that nearly half of the total nitrogen imported into this nation was in the form of cyanamid. From a recent Moscow, Russia, publication, we are informed that the first atmospheric nitrogen fixation plant to be constructed in that country is to use the cyanamid process and will start out with an annual capacity of 10,000 tons.

IMPROVEMENT OF PROCESSES

Various nitrogen fixation processes have gone through the usual evolutions towards becoming more perfect in their operation. The Haber process now, undoubtedly, is more efficient than was the case in 1916. Its efficiency, under the conditions which it must have to be successful, is demonstrated by the increased production of the plants in various nations which have installed this particular process for fixed nitrogen. No doubt, the Haber process will, in future use, be developed beyond the point where it now stands. In the case of the cyanamid process an equal progress is noted. For instance, in 1910 the product of the cyanamid process in America contained not over 17 per cent nitrogen; in 1917, this percentage had increased to about 21 per cent, while at the present time the crude product before it is converted into fertilizer carries 23.5 per cent of nitrogen.

Further efficiency developments in the cyanamid process are found in the increase of furnace sizes which has meant a corresponding decrease in the power consumption per unit of product. Taking the power consumption in 1910 per unit of product as 100, the present consumption of power in 1927 in the large furnaces with improved control stands at 63. Stating this information in a different way, we find that in the earlier periods of production using the cyanamid process a short ton of nitrogen consumed about 3 horsepower-years. In 1912, the power factor per short ton of nitrogen had decreased to 2.5 horsepower-years. Tracing the development down to more recent years, we note that in 1916 Dr. Charles L. Parsons, at that time connected with the United States Bureau of Mines, stated as his opinion that the cyanamid process required 22 horsepower-years per short ton of nitrogen. In striking opposition to this very high estimate is the solid fact that the cyanamid process is now operating under American conditions with an average consumption slightly less than 2 horsepower-years per short ton of nitrogen.

Since the cyanamid process is one of mechanics more than of chemistry, the product can be secured on large scale operations with a minimum employment of labor. This, also, effects a great lessening of the cost factor in the final product. As compared to the production of synthetic ammonia, by using the cyanamid process, approximately two men of every three are eliminated, and the one man left is of that characterization known as the common laborer, whereas under the synthetic production of ammonia, the three men required are really technologists, and under American conditions would require to be paid very high wages.

Perhaps it is not necessary to give so much attention to the question of obsolescence, but if we are dealing with the question of nitrogen at Muscle Shoals, and it can be demonstrated that any particular process, cyanamid

or otherwise, really is obsolete, we should at once eliminate that process from further consideration by Congress. Information such as just given, however, does not give strength to the assertion that the cyanamid process is obsolete.

HOW SHALL WE GET NITROGEN AT MUSCLE SHOALS

Now, the question is: What shall be done in order to get nitrogen at Muscle Shoals? The farmers are the only group which have had from the beginning a consistent nitrogen fixation-fertilizer program at the Shoals. Their program now, as it has been from the beginning, is in favor of leasing the project as a unit to a lessee, thus again committing the farmer to the idea that private operation is to be preferred over and above government operation of this or similar undertakings. Title to properties shall reside perpetually with the United States, and the duration of the contract shall be fifty years. Iron-bound terms must be in the contract which will require the lessee to reach maximum production in as short a time as possible and sell and distribute such production under the jurisdiction of a Muscle Shoals farmer board. The products to be made at the Shoals shall be such as will carry not less than 40 per cent plant food, and there must be no separation of power available at Muscle Shoals from the fixation of nitrogen and the making of fertilizers. The Government must be protected in this contract in regard to payments, both amortization and interest, so that in time it will recover from the lessee the reasonable peace-time costs of the project and still retain title thereto. All this and more is incorporated in the Madden bill, H. R. 441, 70th Congress.

Any proposal which deviates from the above fundamental features of the lease can be accused of not carrying forward the original intent of the Congress when the Muscle Shoals project first was authorized, and assuredly can be criticized as being not what the farmers desire from this great undertaking.

The Public Service of Muscle Shoals

By Mrs. Harris T. Baldwin
Chairman, Committee on Living Costs, National League of Women Voters

MUSCLE SHOALS is a war legacy. Before 1916 our chief source of supply of nitrates needed in the manufacture of munitions was Chile. It was thought that if we entered the World War we should have some means of producing those nitrates in this country. The National Defense Act was passed June 3, 1916. Clause 124 of that Act authorized the President to select one or more sites in this country where cheap water power could be developed for the purpose of extracting nitrogen from the air. The nitrates produced were to be used for munitions in time of war and in the manufacture of fertilizers and other useful products in time of peace. The Act further provided that the plants should be operated solely by the Government and not in conjunction with any other industry or enterprise carried on by private capital.

President Wilson chose the Muscle Shoals at Florence, Alabama, on the Tennessee River. Power was needed for construction work, and the first thing done was to enter into a contract with the Alabama Power Company, which had a steam plant at Gorgas, the mouth of a coal mine, 90 miles south of Muscle Shoals. The plan of work at Muscle Shoals called for three dams, two navigation dams and one power dam, two nitrate plants, two electrical steam plants, power house, lock, industrial village, and the purchase of a large tract of land and the Waco lime quarry. When the armistice was signed in 1918, $105,000,000 had been expended, two nitrate plants and the steam plants were completed and some work had been done on the power and navigation dams. The immediate need for nitrates was passed, and so the question of the disposition of Muscle Shoals came before the Congress.

Congressional Activity on Muscle Shoals

To go into the detail of Congressional activity since 1918 would take far too much time and space. Each year several proposals have been presented to Congress without success. In the spring of 1925 President Coolidge appointed five men to serve on a Muscle Shoals Commission. The duty of this Commission was to assemble reliable information for Congress as to the production of nitrates and to report not later than November 15, 1925, upon the most practical method of utilizing the nitrate plants to the best advantage. During the first session of the 69th Congress four bills and one resolution were introduced. By the passage of the House Concurrent Resolution No. [illegible] in March, 1926, a joint committee on Muscle Shoals was created. This committee was composed of three members from the Senate Committee on Agriculture and Forestry and three members of the House Committee on Military Affairs. They were authorized to conduct negotiations for a lease or leases of the properties at Muscle Shoals and in April, 1926, they recommended a proposal by thirteen allied power companies and submitted a bill embodying this offer.

The first and second sessions of the 69th Congress adjourned without taking any action on this bill, and the

problem of Muscle Shoals remains unsolved.

In the meantime, however, Congress has made provision for continuing construction work on the dams and power house. In 1918 the preliminary work at Wilson Dam such as construction of camp, roads, railroads and coffer works was begun together with the purchase of supplies and equipment. This work was stopped in August, 1918, by order of the War Industry Board and resumed in November of that year. Work on the lock and dam and power house was continued until June, 1921, when because of lack of funds it was gradually shut down until it was practically on a maintenance basis, and it was not until the fall of 1922 that funds were available to actually resume work.

Wilson Dam and the power house were completed in 1925, and the first generator to be put under load was in September of that year. This work has been done under the supervision of army engineers.

LEAGUE OF WOMEN VOTERS AND MUSCLE SHOALS

Since 1921 the National League of Women Voters has had Muscle Shoals on its program. For five years the League studied it carefully from all angles. And in the Convention of 1926 the League went on record as favoring Government operation of Muscle Shoals.

It has been my privilege within the last month to be one of the two members of the National League of Women Voters to visit Muscle Shoals. For six years we have attended the Congressional hearings, we have sat in the gallery of both the House and the Senate and listened to the debate on the floor, we have read everything available and have talked to many people regarding its disposition. Within the last year statements have been made which have in part contradicted much that we had read. We were told that Muscle Shoals was in a run-down condition, going to rack and ruin, that rust was the predominating color at the nitrate plants, that the potential power there was of no importance to the South. In fact one of our League members living in a southern state received with her October electric light bill a flier which read in this manner: "Do not believe all you read and hear about Muscle Shoals; there is not power enough there to supply more than one small town." We decided to go and see for ourselves.

There was no rust. It came to us forcibly when we first stepped into one of the buildings of the nitrate plant No. 2. For nearly ten years the machines have stood idle, yet each was cleaned, polished, oiled. The only rust we saw was on a small scrap heap which had been dumped from some other war activity and which the Army Engineer in charge of Muscle Shoals had no authority to move. We looked for signs of deterioration and ruin, and were only conscious as housekeepers that Uncle Sam knew how to keep property under his care in excellent condition.

Our first desire was to see Wilson Dam and the power house, and to check up on the statement that the power developed there was of no great importance. It would be impossible to describe the physical structure of Wilson Dam. To a woman it seems nothing short of a miracle that human hands working against such odds could build it. The mere mathematics of it are almost beyond her ken. What she can understand, however, are the possibilities of such a project once it is finished.

POWER FROM MUSCLE SHOALS

It was in the power that our great interest centered, because we had a vision of what power from Muscle Shoals might mean to the homes in that region. While we wait for Congress' decision some power is being generated and sold to the Alabama Power Company. Eight units in the power house are ready to be put in operation and there are wheel pits for ten more units. Not more than four units have been in operation at a time. We learned the "flier" to the contrary that it was not because of lack of power, but because of the inability of the Alabama Power Company to take it away. According to the figures of the Army Engineer in charge the capacity of the Alabama Power Company transmission lines from nitrate plant No. 2 is 120,000 kilowatts with normal line losses, and this capacity can be increased to 130,000 kilowatts by overload.

We were given to understand it would cost the Alabama Power Company several million dollars to build transmission lines capable of taking away the power which can be developed. One reason why this has not been done is because with the fate of the Muscle Shoals still undecided no long-time contract may be made. Hence, on thirty days' notice the Government can stop selling power. For this power which the Government sells the Alabama Power Company pays 2 mills a kilowatt hour—it is sold in Alabama up to 8 cents a kilowatt hour.

These are the figures given us by the Army Engineers on the revenue received from the sale of electric energy generated at Wilson Dam from September 12, 1925, to October 31, 1927:

September 12 to October 31, 1925..	$73,453.37
January 1 to December 31, 1926...	872,617.47
January 1 to October 31, 1927....	1,020,535.78
Total.....	$1,966,606.62

During the operating period in 1925, the hydraulic and electrical machinery was being tested and it was impracticable to run more than one unit at a time, and operation was intermittent, due to the necessity of changing connections, making adjustments, etc. The testing continued to March 31, 1926, but four units were available after December 31, 1925. April 1, 1926, is taken as the date on which the plant was placed in commercial operation.

No power was sold from July 5 to 15 inclusive, 1926, during which time a new agreement was under consideration by the War Department and Alabama Power Company.

The money received from the sale of power is deposited in the Treasury of the United States as "miscellaneous receipts."

It is interesting to compare the annual revenue from three or four units at 2 mills per kilowatt hour with the best power bid which has as yet been submitted. If the Government accepted this bid it would receive during the fifty years of the lease $600,000 per annum for six years, $1,200,000 per annum for the next six years, $1,500,000 per annum for the next six years and $2,000,000 per annum for the remaining thirty-two years.

We were intensely interested in the figures of Mr. J. C. Stiles, who is engaged in power study work under the district engineer at Florence, which showed the relative output of electric energy in several southern states. According to his figures the public utility companies in the state of Alabama, including Wilson Dam, produced in 1926 1,582,717,000 kilowatts; in Georgia, 710,578,000 kilowatt hours; in Mississippi, 58,667,000 kilowatt hours, and in Tennessee, 894,015,000 kilowatt hours. The kilowatt hours produced at Wilson Dam during that

period were 436,308,735 kilowatt hours. Mr. Stiles figures that Wilson Dam is capable of producing from 1,500,000,000 to 2,000,000,000 kilowatt hours per annum.

Muscle Shoals has a weak spot which must be considered. The flow of the river is far from constant; it varies with the seasons; the primary power in round numbers is 100,000 horsepower. Yet at times of the year enough water goes over the dam to make a million horsepower. There are two ways of equalizing the flow: by storage dams and by supplementary power from steam plants. Already estimates have been made for a second power dam at Cove Creek on the Clinch River. If this were constructed it would double the primary power at Wilson Dam.

GOVERNMENT OPERATION OF MUSCLE SHOALS

One of the reasons underlying the League of Women Voters' stand for Government operation of Muscle Shoals was the feeling that Muscle Shoals and the Tennessee River should be developed as one project, that there are three phases of such project, power, flood control, and navigation. The Tennessee River flows through the heart of the South. In its unimproved state it is not navigable. Senator Norris of Nebraska writing in "The New South," July, 1927, says regarding navigation, "In order to secure to the people of the South the use of their own property, it was proposed in Congress that the Government should make a complete survey of the Tennessee River and all its tributaries, and that there should be built from time to time during the next ten or fifteen years, a network of dams for the improvement of navigation, the control of flood waters, and the development of electricity. It is only by dealing with a system of this kind we can get the maximum amount of benefit from the minimum cost."

AID TO NAVIGATION

An attempt to aid navigation in a small way has been made at Dam No. 1, which is a navigation dam. Dam No. 3 is to be a navigation dam also, but work has never really been started on it. The chief of engineers has stated that $9,000,000 is a fair assessment for the benefits to navigation of Dam No. 1, and the President's Muscle Shoals Commission estimated $10,000,000.

Wherever Muscle Shoals is discussed there is always the cry "cheap fertilizers for the farmer." It has come almost to be a political slogan. There are those who think that the power at Wilson Dam should be used exclusively for the manufacture of fertilizers in time of peace. They think that if the nitrate plants are leased Wilson Dam should be included and if there is excess power it may be sold by the lessee. There are others who feel that it is a questionable thing to lease on those conditions. It has never yet been satisfactorily proven that cheap fertilizers can be produced at nitrate plant No. 2.

At the time the National Defense Act was passed it was generally believed that by the use of cheap power we would be able to take nitrogen from the air at a cost that would lessen the cost of fertilizer.

The Arc process was the first method used to take nitrogen from the air; it required a great deal of cheap power. The cyanamid process was discovered to take much less power. It was known that the Germans were working on a method said to be a great improvement over the cyanamid process. This was known as the Haber process. While the details of this process were not fully understood, still the experts thought there was a chance to con-

struct a plant using this process to extract the nitrogen from the air. Nitrate plant No. 1 was in the nature of an experiment and was a total failure.

The building is supplied with a steam plant and can be used for other commercial purposes. Since the war, however, we have learned the details of the Haber process. Constant improvement is being made, and with every new improvement less and less power is needed. Today anyone constructing a nitrate plant locates it near the source of cheap coal rather than water power.

Nitrate plant No. 2 is constructed to extract nitrogen from the air by the cyanamid process. It is capable of extracting 40,000 tons of nitrogen from the atmosphere in a year. The process is not obsolete, but experts say the time is not far distant when it will be. The American Cyanamid Company has submitted a bid for nitrate plant No. 2 which includes Wilson Dam.

Are we going to sign away our property for fifty years? Are we sure that the American Cyanamid will produce a fertilizer which will be cheap for the farmer? Is it not possible that within a period of fifty years experimentation in the manufacture of nitrates will reach the place where very little power will be used even in the cyanamid process? Who will get the benefit of the sale of the surplus power from Wilson Dam, and is the rental which the Cyanamid Company offers large enough to repay us for investing about $160,000 and for giving up our property for half a century?

The late Walter Durand in his last article called attention to the "need for public yard sticks" by which public and private ownership of power enterprises might be measured. We are constantly being told that public ownership will not work. We have no great public power enterprise and therefore no means of comparison, and the National League of Women Voters feels that Muscle Shoals rightly developed could be used as a "public yard stick."

Book Department

LATANÉ, JOHN H. *A History of American Foreign Policy.* Pp. xiv, 725. Price, $4.00. Garden City: Doubleday, Page and Company, 1927.

The general interest in questions of international relations since the World War and the new courses being offered on that subject in our universities and colleges have been recently met by a number of volumes which attempt to present the foreign policy of the United States as a continuous development from its beginnings to the present day. The volume before us is the latest of these, and it will receive a cordial welcome from the public at large as well as from academic circles. For it is not only a scholarly treatise, such as might have been expected from one of the author's professional standing, but is at the same time an unusually readable story, told in easy narrative form, made graphic by the introduction of numerous quotations from documentary material, and interspersed with the author's comments and occasional vigorous criticisms.

A History of American Foreign Relations might perhaps be a more descriptive title. For the volume covers all of the important incidents in the diplomatic intercourse of the United States and introduces a number of topics and much historical detail which could scarcely come under the head of "Foreign Policy" if by that title is meant the principles which more or less consistently have guided the United States in its relations with other states. The chronological method, inseparable from a history, is relieved by a topical treatment consisting of six periods, each marking a new trend in our foreign relations. "Republican Principles and Ideals" covers both the French Alliance and the policy of neutrality. "Defiance of the Old World" includes the struggle for neutral rights and the announcement of the Monroe Doctrine. "Rounding Out Seas and Looking Over Borders" deals with territorial and commercial expansion and the opening of the Far East. "Safeguarding the Union" is concerned primarily with the diplomacy of the Civil War, while "Expansion in Caribbean and Pacific" and "Intervention in Europe" take up the more recent phases of American diplomacy.

Among the many judgments which the author expresses upon men and events it is interesting to note his defense of Jefferson's position in 1793, his legal justification of the Louisiana Purchase, his criticism of the anti-slavery tradition with respect to the annexation of Texas and the Mexican War, his defense of the Clayton-Bulwer Treaty, and, coming down to more recent times, his sharp criticism of Secretary Hughes' policy towards the League of Nations. The survey of the events leading up to American participation in the World War and of the attitude of the Senate towards the League of Nations is written with a conscious effort at impartiality, although it is clear on which side the sympathies of the author lie. A closing chapter asserts that the present policy of "Coöperation without Entangling Alliances" is "an empty formula" and "a species of camouflage," and points out that both the economic rehabilitation of Europe and the problem of disarmament are fundamentally political questions.

The typography of the volume is quite equal to its contents. The marginal headings are an undoubted help to the student, and the blocking of direct quotations from documentary material will be of great assistance to teachers in using the volume as a basic text. Professor Latané's volume is destined to have a wide circulation in our universities and colleges and it is to be hoped an equally wide circulation outside of academic halls in view of the urgent need for accurate and unbiased information upon American foreign policy in the light of its past traditions.

C. G. FENWICK.

SAENZ, MOISES and PRIESTLEY, HERBERT I. *Some Mexican Problems.* Pp. ix, 174. Price, $2.00. Chicago: The University of Chicago Press, 1926.

These six lectures on Mexico were delivered during the summer of 1926 before the

Third Institute on the Harris Foundation at the University of Chicago. The first three deal with the Program of the Mexican Government and were delivered by Señor Moises Saenz, Subsecretary of Education of Mexico. The last three lectures are by Herbert I. Priestley, Librarian at the University of California, author of the best recent history of "The Mexican Nation" (1923), and an acknowledged authority on that country.

This small volume contains a keen critical analysis of present conditions in Mexico. Its discussions of the recent relations of the United States with its southern neighbors are most enlightening. Señor Saenz maintains that there has been but one revolution in Mexico since 1910—the continuous fight of the landed aristocracy against the people, of "privilege against destitution." He shows the marked progress made by labor in his country under the influence of the American Federation of Labor. His discussion regarding the influence of American capital and commerce in Mexico tends, however, to be an *ex-parte* statement; it leans toward nationalistic resentment rather than scientific accuracy.

Dr. Priestley's discussions are masterly—neither fulsome praise nor passionate condemnation of American policies. They supplant the querulousness of diplomatic legalisms with a warmth of neighborly respect and admiration.

HARRY T. COLLINGS.

RIPLEY, WILLIAM Z. *Main Street and Wall Street.* Pp. v, 359. Boston: Little, Brown and Company, 1927.

It is only seldom that the vituperative pen of a college professor creates the commotion which was aroused in financial and official circles by the publication of the series of articles on corporate practices which first appeared in the *Atlantic Monthly* and which were subsequently expanded into the present volume. Members of the New York Stock Exchange literally "sat up and took notice." The Interstate Commerce Commission, in several of its recent decisions, has heeded the note of warning sounded by Professor Ripley, while the Committee on Industrial Securities of the Investment Bankers Association of America has publicly expressed its disapproval of some of the corporate machinations elucidated so forcefully in *Main Street and Wall Street.* In the words of the author "such immediate and well-nigh unanimous response to but a slight stimulus is perhaps unique in our economic annals." It reflects not only a growing consciousness of the existence of unsocial tendencies in modern corporate activity, but more interestingly reveals the fact that the modern college professor can and does at times step out of his proverbial rôle of groping abstract theorist to hold up the mirror to the grim realities of life.

Main Street and Wall Street makes decidedly entertaining as well as profoundly instructive reading. Even though we may be inclined to minimize the importance of voting rights to the average stockholder and to deprecate the significance of divesting ownership from control in modern corporate procedure, the fact remains that the author has rendered a very timely service by inquiring "deeply concerning those things which might better serve the common good than is now the case."

KARL SCHOLZ.

TARDIEU, ANDRÉ. *France and America: Some Experiences in Coöperation.* Pp. viii, 312. Price, $3.00. Boston and New York: Houghton Mifflin Company.

M. Tardieu, in this excellently written book, presents a picture of the relationship that has existed between his country and America since its founding. Remarkably unbiased in his point of view, he applies to the problem his extensive knowledge of American political and social institutions and habits of mind. He shows clearly, insistently, that the two races, so opposite in historic traditions, in ideas of government, in temperament, have much to offer each other in the way of mutual help and understanding. The problem of tomorrow, he says, is the proper ordering of Franco-American friendship that it may be fruitful.

The war brought into close contact two countries that are potential enemies; since 1918, however, the gap has again widened rather than lessened. France, concedes Tardieu, has as frequently taken the wrong course in her dealings as has the United

States. It is necessary that she borrow some of America's optimism, that she group her forces rather than her weaknesses, that she put herself on a footing of equality with the United States. America, on the other hand, must become more human, must cultivate greater commercial tact, must commit fewer errors of judgment and action. Each country must learn to know the other better.

The book is conceived along optimistic lines. Tardieu is convinced by reason and by experience of the coming enlightenment for which he pleads.

DOUGLAS L. HUNT.

SAIT, EDWARD M. *American Parties and Elections.* Pp. vii, 608. New York and London: The Century Company, 1927.

This book starts off with a discussion of manhood suffrage and registration, Negro suffrage in the South, woman suffrage, and organized groups and public opinion. The author justifies this on the basis of a statement that these are the instruments of the party. He then turns to the nature and history of parties, party organization, nominations, and finally again to elections. The text is replete with citations and numerous and pertinent quotations from the sources. The style is clear and interesting. The book is useful as a textbook for universities, but also as an interesting handbook for the many newer voters of the country who are anxious to learn the ways of politics and politicians.

CLYDE L. KING.

ENGELMANN, GEZA, PH.D. *Political Philosophy.* Pp. xxiv, 398. Price, $3.00. New York and London: Harper and Brothers, 1927.

This is the translation of a book by this title written by the Hungarian scholar, Doctor Geza Engelmann. The translator is Doctor Karl Frederick Geiser, Professor of Political Science in Oberlin College. Introductory notes have been added written by Professor Oscar Jaszi, giving the background of the times in which each of these authors lived, with the exception that the introduction on Hamilton, Madison and Jay was written by Doctor Geiser.

This is not a résumé of the more important theories of the classical political scientists, nor is the book made up of excerpts of the original text with comments and footnotes. On the contrary, Doctor Engelmann presents what he finds to be the essence of the theories of fifteen of the greatest philosophers of the State. The leading and creative ideas of each phil osopher are given. In his own footnote Doctor Engelmann said that his aim was "not to interpose my own ideas in a way that might seem inappropriate or disconcerting, but rather to arrange and formulate their thoughts clearly and concisely, as if the masters themselves were presenting, in a brief discourse, whatever in their teachings is of importance to us—their legacy to us."

The political scientists whose works are thus presented are Plato, Aristotle, St. Thomas Aquinas, Dante, Machiavelli, Thomas More, Thomas Hobbes, Baruch, Spinoza, John Locke, Charles de Secondat, Baron de Montesquieu, Jean Jacques Rousseau, Alexander Hamilton, James Madison, John Jay, and Jeremy Bentham.

CLYDE L. KING.

OGBURN, W. F., and GOLDENWEISER, A. *The Social Sciences and Their Interrelations.* Pp. viii, 506. Price, $3.50. Boston: Houghton Mifflin Company, 1927.

The development of specialized social sciences from "the metaphysical cradle of Mother Philosophy" has been accompanied by such an intellectual division of labor that synthesis as well as analysis has now become necessary. The student within a particular field becomes so engrossed with his specialty that its relationship to the general field of the other social sciences is apt to be obscured.

Although the task of an Aristotle, or even of a Herbert Spencer, in the synthesis of all knowledge seems difficult to imagine today, it does seem possible and desirable occasionally "to beat the boundaries" of the different social sciences and to glimpse as a whole the "no man's lands" of social science. To see the interrelationships of the different social sciences and to discover the effects of recent developments within each social science on all the others is the

ambitious purpose of this new book of Professors Ogburn and Goldenweiser.

The social sciences are divided into five grand divisions. In the first portion of the book the relationship of anthropology is traced to each of the other social sciences. Then follow, in turn, discussions of the relationship of economics, of history, of political science and of sociology to each of the other social sciences. There is an introductory chapter on the general field of the social sciences and a concluding section on the relations of the social sciences in general to such allied fields as biology, education, the natural sciences and philosophy.

As each chapter is written by a different author, some duplication and a lack of continuity are inevitable. Moreover, there are certain apparent differences in method of treatment and in the value of the various contributions. Again, the editorial pressure to compress within one small book this enormous field has resulted in many brief statements, which call for expansion, and certain general statements, which require further explanation.

The reviewer would not presume to pass on the "correctness" of the divergent points of view of the numerous authorities in these many divergent fields. Such a clash of opinion is to be desired as well as to be expected. Therein lies one of the chief merits of the book.

The authors of the different chapters are leaders within their respective fields. The editors are to be congratulated on having secured the coöperation of such a group of social scientists. The national and international reputations of the contributors to this volume make it deserving of the study of all teachers and advanced students of the social sciences.

The Social Sciences may perhaps be described as an orientation textbook for all graduate students in the social sciences. Although open to many criticisms—chief of which is that it has attempted the impossible—this book makes a real contribution in itself, as well as pointing the way toward a more comprehensive and intensive synthesis of the social sciences.

S. HOWARD PATTERSON.

KILBORNE, RUSSEL DONALD. *Principles of Money and Banking.* Pp. vii, 559. Price, $4.00. Chicago: A. W. Shaw Co., 1927.

Professor Kilborne has in a single volume essayed to cover an extensive field. The book is divided into four parts, one on Money, another on Foreign Exchange, another on Commercial Banking and the Federal Reserve System, another on Non-Commercial Banking. Under the last heading there are chapters on Trust Companies, Savings Banks, Investment Banks, Investment Trusts, the Federal Farm Loan System, and the Federal Intermediate Credit System. The broad scope of the work leads to its chief defect. To compress his material within the limits designed, Professor Kilborne has been forced apparently into a rather didactic treatment. Principles are set forth without sufficient demonstration to make them entirely clear, and occasionally controversial matter is presented in a positive way as though it were a statement of fact. For example, on page 93, "While the national banks are still allowed to issue notes, the issue function *will within a short time* be granted only to the Federal Reserve Banks." No doubt that is the hope of most students of currency problems; it may even be highly probable, but whether it will occur within a short time depends upon the action of the government when the bonds securing the currency mature.

The author explains his method of treatment by pointing out in his preface that he is emphasizing fundamentals and principles rather than facts and structure. Although the work contains no original contribution to monetary and banking theory, it is clearly written and its subject matter is logically developed. It should be of value to those who desire to obtain a general picture of a broad field without delving deeply into any part of it.

W. CARLTON HARRIS.

GARIS, ROY L. *Immigration Restriction.* Pp. xv, 376. Price, $4.00. New York: The Macmillan Co., 1927.

Professor Garis has attempted a history of the development of "the opposition to

and the regulation of immigration into the United States." It was not his purpose, however, "*to judge the merit and truthfulness* of the causes of the opposition and legislation" (p. xi).

This is to be regretted, for throughout the study he gives the impression of taking the position that any sort of restriction legislation is better than none. It would seem that in a history the author should refrain from constantly praising any given policy unless sufficient evidence is included in support of such an attitude. There is no adequate analysis of the economic, social or biological effects of immigration, yet there is assumed an urgent need for legislation to prevent the immigrant from swamping our industries, disrupting our government, filling our jails, hospitals and almshouses and lowering the biological qualities of our population. Perhaps the writer's approach is in a way indicated by an isolated illustration. In partial support of his statement that "For America, the Japanese are a nonassimilable people, as are all Asiatics . . .," he quotes the two lines from Kipling beginning "East is East . . ." (p. 353).

In spite of this bias, *Immigration Restriction* is a most valuable study. The development of the restrictionist policy (as a restrictionist sees it) from Colonial times to the present is clearly presented though much is necessarily omitted. All important immigration legislation is admirably summarized. Special chapters deal with Chinese and Japanese immigration. The brief foreword by the Honorable Albert Johnson, Chairman, Committee on Immigration and Naturalization, House of Representatives, whose immigration policies are well known, strikes the keynote for the volume.

DONALD YOUNG.

MCCOMBS, CARL E. *City Health Administration.* Pp. 524. New York: The Macmillan Company, 1927.

The author, in the preparation of this volume, has aimed to present a non-technical treatise on municipal health administration. An introductory section considers, first, the place of municipal health service in the field of public welfare, and, second, the administrative relations of the preventive and curative health functions. Great emphasis is placed upon the advantages to be derived from the consolidation of all health and welfare functions in a single department with a competent administrative head. A second section, comprising fully two-thirds of the volume, deals with the organization and administration of sickness preventive functions, certainly the larger and more important aspect of the municipal health service. Subjects under this section which chiefly engage the attention of the writer are the problems of personnel, functional organization, vital statistics, food and sanitary inspection, health education, and finance. A final section, dealing with the organization and administration of sickness treatment functions, analyzes numerous problems arising in connection with municipal hospital service.

Dr. McCombs has rendered a valuable service in making available the results of numerous municipal health surveys. The work is comprehensive and authoritative. The author's wide experience, which has brought him into close contact with actual situations, militates against any tendency on his part to become dogmatic in his discussion of principles. There can be little question but that this is the best treatment of municipal health service in the United States that has as yet appeared. The volume contains an excellent bibliographical accompaniment.

MARTIN L. FAUST.

YOUNG, ALLYN A. *Industrial Combinations and Public Policy.* Pp. 331. Price, $2.50. New York: Houghton Mifflin Co., 1927.

This book dealing with one of the most important of modern economic problems is equally well suited for use as a text for courses in Trusts and Monopolies and for the purposes of the general reader. The book meets the claims made for it in the Editor's Introduction, where it says that "the tone of the book throughout is that of thoughtful and candid discussion."

In his treatment of the subject, *Industrial Combinations and Public Policy*, the author gives the combination movement its his-

torical setting; analyzes its general economic aspects; appraises carefully the results of combinations in a number of important industries; and then at the end there is a judicious balancing of the various considerations that help to determine what public policy should be. There are different types of industries, however, and no single system of control will work well throughout the whole field. The criteria which set apart the different types of industry are examined, and reasoned conclusions are reached with respect to the method of control which appears to be best adapted to each type.

W. C. PLUMMER.

WELD, W. E., and TOSTLEBE, A. S. *A Case Book for Economics.* Pp. xiii, 508. Boston: Ginn and Company, 1927.

VANDERBLUE, H. B. *Economic Principles: A Case Book.* Pp. xvii, 670. Chicago: A. W. Shaw Company, 1927.

New college texts in economics have been numerous, but real pioneers have been rare. There are many texts on economic principles, on economic problems, and on economic principles and problems combined. There are also several collections of readings in economics and also several excellent books of questions and exercises based on various standard texts. But an unfilled need, often expressed at meetings of the American Economic Association, has been for a case book for teachers of economics who desire to follow this particular method of presentation. At last, the tools for teaching economics by the case method have been provided by the publication of the two books under review.

After an examination of these excellent texts of Professor Vanderblue and of Professors Weld and Tostlebe, the reviewer is still uncertain as to just what constitutes a case book in economics. How does it differ from a live book of readings, well selected, carefully pointed toward certain educational objectives and with leading questions appended to each selection? Although there are many first-hand cases taken from actual industry, which give these books a realistic flavor, there are also many mere descriptions which differ little from those found in a good book of readings. Indeed, the first "case" in Professor Vanderblue's book is the classical illustration of division of labor, which is taken from Adam Smith's famous picture of the manufacture of pins. Although the reviewer knows of no better description of division of labor than that of Adam Smith, does this constitute a "case"?

The case book of Professor Vanderblue seems more adapted to the needs of advanced students, and that of Professors Weld and Tostlebe more suitable for less advanced students of economics. Again, the arrangement of Professor Vanderblue's book seems more logical. At least, it conforms more nearly to the generally accepted plan of organization. It follows rigorously that of Professor Taussig, and the assumption is that the student will read the corresponding chapters of the latter's "Principles of Economics." Nevertheless, each chapter of Professor Vanderblue's case book contains specific references to most of the other standard texts on economic principles. It is also well indexed and contains an appendix consisting of an alphabetical list of cases in addition to the logical enumeration of cases contained in the table of contents. On the other hand, the case book of Professors Weld and Tostlebe contains neither an index nor references to general texts on economics. The suggestion is made that, "The cases may be used in any convenient order and with any of the textbooks."

It is not part of the reviewer's task to discuss the advantages and disadvantages of teaching economics by the case method, which has long been the favorite method of teaching law. It is merely his pleasant function to announce that there are now available in book form materials for the teaching of economics by this method. Actual classroom experience alone will demonstrate the possibilities and limitations of teaching economics by the case method.

S. HOWARD PATTERSON.

BECKER, CARL. *Our Great Experiment in Democracy.* Price, $3.00. Pp. ix, 332. New York and London: Harper and Brothers.

This is a reprint, with slight revisions, of the author's "The United States: An Ex-

periment in Democracy," first printed in 1920. The book deals in a most interesting fashion with America and democracy, the origins of democracy in America, the new world experiment in democracy, democracy and government, new world democracy and old world intervention, democracy and free land, democracy and slavery, democracy and immigration, democracy and education, and democracy and equality.

What the author of the book calls the publisher's "blurb" on the jacket in which the publisher says that the book gives "a clear, honest, and brilliant picture of the United States as a democracy from the first Continental Congress down to the Harding Administration" is a fair statement of the style and contents of the book. The point of view of the book is expressed in the following quotation: "Political democracy we have; but the old economic democracy is rapidly becoming a thing of the past. To achieve, under these changed conditions and by new methods, the economic freedom without which political freedom is of little use is the task of the coming years."

CLYDE L. KING.

CLEVELAND, FREDERICK A. *American Citizenship as Distinguished from Alien Status.* Pp. 464. Price, $4.00. New York: The Ronald Press, 1927.

This volume appears as the first of a series to be published by the Department of Citizenship of Boston University in partial fulfillment of the University's obligation under the Maxwell Foundation. The purpose of this book, as stated by Doctor Cleveland, is to set forth what the citizen's relation is to the community by means of a scientific presentation of the facts which it is thought each American citizen and each "stranger within our gates" should know about his status. The twenty-one chapters into which the development of the subject is divided are grouped under the heads of "Citizens as Members of Political Society," "Citizens and Aliens as Beneficiaries," and "Citizens and Aliens as Subjects." Three chapters, VIII, IX, and X, are acknowledged as comprising substantially the same material as was submitted for a Master's degree thesis by an associate in the Department of Citizenship.

While Doctor Cleveland states in his preface that the volume "undertakes to set forth in clear and orderly terms the meaning and implications of American Citizenship as defined in the constitutions of the nation and the states, in statutes, the decisions of courts, and the utterances of government officials," he proceeds to ignore official documents almost entirely and to assemble his facts for this undertaking to a great extent from secondary sources, frequently in the form of lengthy quotations and very unfortunately, in several instances, from works which have been rendered out of date by recent constitutional or statutory changes. An error such as appears in the direct quotation on page 167, where nine states are mentioned as granting suffrage rights to aliens who have declared their intention to become citizens, is due to the fact that the quotation is taken from a work published in 1914. But no such obvious reason is apparent for the error on page 57 where it is stated that naturalization can be administered by United States courts only.

The latter part of the book (Part III) is by far the best. Chapter XIV, "American Conceptions of Sovereignty," and Chapter XVII, "Individual Liberty and Authority," are especially stimulating. The extensive bibliography and the thirty-seven pages of Questionnaire and References to Special Readings, add considerably to the value of the book.

J. TANGER.

PATTERSON, EDWIN WILHITE. *The Insurance Commissioner in the United States: A Study in Administrative Law and Practice.* Pp. xviii, 589. Price, $6.00. Cambridge: Harvard University Press, 1927.

This volume is the first of a new series of Harvard Studies in Administrative Law. It is a remarkably able summary and criticism of the forty-eight state departments of insurance based on an exhaustive study of statutory enactments, judicial decisions, departmental rulings and actual practice. The organization, personnel, functions, scope of administrative control, methods of control and amenability to external control of the state departments of insurance are

considered in order.

Professor Patterson presents a clear-cut study of one of the most outstanding recent developments in American legal history, namely, the application and enforcement of law through administrative agencies rather than through the ordinary courts.

I. L. POLLOCK.

BEELEY, ARTHUR LAWTON. *The Bail System in Chicago.* Pp. 189. Price, $2.00. Chicago: University of Chicago Press, 1927.

This is a social service monograph recording the results of a pioneer study of the question of bail, with the main idea in mind of discovering a method for predicting the moral risk involved in releasing an accused person without bail pending trial. This investigation will impress the reader as presenting some original and helpful ideas for the improvement of minor and major courts, especially the substitution of the summons for the warrant of summary arrest in all cases where the accused is reasonably sure to appear for trial, and the extension of the Juvenile Court jurisdiction to all persons nineteen years of age or under.

EDWIN O. LEWIS.

FRANKLIN, FABIAN. *The ABC of Prohibition.* Pp. 150. Price, $1.00. New York: Harcourt, Brace and Company, 1927.

This little volume does not purport to be any exhaustive analysis of the prohibition problem, but is merely, as its title suggests, a review of the outstanding features of the question. Mr. Franklin is a philosophical anti-Prohibitionist, and he confines himself almost entirely to a statement of general principles against the Eighteenth Amendment. He admits the inadequacy and ambiguity of statistics, and makes only very slight use of them. He is surprisingly candid and liberal toward the Prohibitionists, although it must be said, I think, that in connection with the reasons for prohibition and the causes of crime he does not say all that might be said for his opponents.

J. H. LEEK.

SEARS, MARTIN. *A History of American Foreign Relations.* Pp. 648. Thomas Y Crowell.

This excellent book of Dr. Sears meets a long-standing need in the literature of American foreign policy. Without attempting to enter into too great detail, the author has given a comprehensive and at the same time philosophic presentation of the development of American foreign policy. One cannot help but admire the self-control shown by Dr. Sears in eliminating the unessential and in confining himself to the basic influences that have determined the foreign policy of the United States.

In many respects, Dr. Sears' book is the most comprehensive text book on American foreign policy that has appeared. It is peculiarly well adapted to purposes of instruction in high schools and colleges and will serve to stimulate the broadening of instruction in this field in our secondary schools and colleges.

CHAPMAN and WESTERFIELD. *Problems in Banking, Money and Credit.* New York: The Ronald Press Company.

This book is designed to meet the vogue of the problem method. The subjects on which problems are presented run the gamut of the field of finance. While very suggestive, many of the problems are undeveloped.

GUEST, HAROLD W. *Public Expenditure.* Pp. xiv, 217. Price, $1.75. New York-London: G. P. Putnam's Sons, 1927.

This book is entitled *Public Expenditure.* The subtitle is "The Present Ills and the Proposed Remedies." One chapter of the book is devoted to the growth of public expenditures, a total of about twenty pages. There is nothing new in the analyses of the figures of this chapter. The remaining two hundred pages are devoted to a rehash of modern social psychology and of some of the classical theories of public finance.

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GREAT BRITAIN'S RECENT TREND TOWARD PROTECTION

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FOREWORD

GREAT BRITAIN has in recent years abandoned the principle of a "tariff for revenue only" as the all-inclusive formula underlying her national fiscal policy. Such a conclusion is supported by the facts which have been assembled in the following study. For many decades ardent believers in free trade, the British have finally succumbed to pressure for modifications along protectionist lines. In a period when world commerce has been expanding to an extent never before experienced, the multiplication of trade barriers presents a serious problem. The application of tariffs menaces and even hinders the continued growth of economic interdependence. This shift in British policy, therefore, is of utmost interest and significance.

It is hoped that the explanation of Great Britain's present tariff position offered in the succeeding pages will assist the reader in understanding her change of system. Such an understanding requires some familiarity with the history of British free trade because the roots of the movement lie in the past. The first chapter, accordingly, contains a brief review of developments prior to the war. The next two chapters trace the trend to the time of writing. Subsequent chapters include an analysis of the various economic forces tending to effect an alteration in the fiscal policy, while the final chapter is given to summary and conclusion.

RALPH A. YOUNG

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Great Britain's Recent Trend Toward Protection

CHAPTER I

Free Trade in Great Britain Prior to 1914

In January, 1846, came the culmination of long political strife over the tariff issue in the repeal of the Corn Laws. Subsequent years witnessed the vestiges of the old tariff system gradually destroyed. By 1860, the year of Cobden's famous Anglo-French commercial treaty, just forty-eight dutiable articles remained in the tariff schedule and only fifteen of these contributed to revenue.[1] From this date on until 1914, the British tariff schedule was characterized by an absence of duties for other than revenue purposes, The expression, "free trade," became literally descriptive of the British fiscal policy in this era. While free trade was in the ascendancy, tending each decade to become more thoroughly institutionalized, there were, now and again, outbreaks of public opinion from interested quarters demanding an active protectionist tariff policy. From 1900 to 1914, such a movement attained considerable momentum, culminating in the commitment of the Conservative Party to a program of tariff reconstruction, while the Liberal Party remained staunch protagonists of the historic policy of free trade.

The story of the struggle over the fiscal policy during this period holds important source material for such a study as the present one. It is not our task, however, to write a history of the British fiscal-economic policy of tariff for revenue only. We are interested primarily in recent developments. Nevertheless, since some familiarity with the earlier story is indispensable to an understanding of the present trend, it is desirable to point out in review what seem to be the most significant aspects of the pre-war trend. Our review will be a summary rather than a detailed account.

[1] Hirst, F. W., *From Adam Smith to Phillip Snowden* (Unwin, London, 1925), p. 41.

Free Trade and the Flowering of British Industry

Far-reaching reorganization of British industrial life had been the result of the industrial revolution. The new technique of production acquired therefrom provided the capacity for a tremendous expansion of trade. A large foreign market anxious to accept British products in exchange for raw materials and foods stimulated the industrial processes and hastened the full development of the British industrial system. A combination of circumstances, climate, resources, population, creative energy and trading experience enabled Great Britain to utilize effectively the new methods of intensive production. Although population underwent a growth of, roughly, 60 per cent from 1801 to 1851, British export figures, with allowances made for price changes, show an increment of 100 per cent from 1805 to 1840, and about 90 per cent in the next ten years, or a growth of almost 400 per cent for the entire fifty-year period. Real exports of British produce, therefore, were increasing up to 1840 at a slightly greater

rate than population, and after that date, at a much greater rate.

For twenty years after 1850 British trade continued to advance with great strides. A superficial observer might account for this by citing the repeal of the Corn Laws and the inauguration of a free trade fiscal policy, but many other factors contributed, among them, the extensive discovery of gold in this period; [2] the growth of railroad and steamship transportation; the rapid expansion of other human wants, satisfied by machine production, and England's early start in this field; the freedom of British trade from the disturbance of war and the foreign demand for her products stimulated by the American Civil War, Austro-Prussian War and Franco-Prussian War; [3] and finally, the reaction against extreme tariff barriers abroad and the extension of the "most-favored nation" privilege through treaties.[4] Other considerations, too, doubtless contributed to Great Britain's rise to dominant power in the field of foreign trade. This phenomenon, it should be recognized constantly, was the result of an inextricably complex mass of forces.

Succeeding the era of unprecedented prosperity was a period fraught with problems which brought the question of protection once more to the fore. The year 1868 witnessed the most serious industrial and trade depression experienced since the adoption of a free import policy. In this year a "Revivers of Trade Association," organized for the purpose of advocating reciprocity or retaliation against those countries erecting harmful tariff barriers, carried the question before the public.[5] Although the movement died down when trade momentarily revived from 1870 to 1873, interest was resuscitated in the succeeding year. To this flame was added the fuel of sugar bounties on the continent and the denouncement of the Anglo-French commercial treaty by France. Finally, in July, 1861, a new organization, composed of a number of manufacturers drawn together by the continued depression, was called into being under the title, "National Fair Trade League," which advocated a comprehensive change in the fiscal policy.[6]

The new movement quickly aroused interest, and in the depression during the middle of the eighties, assumed large proportions.[7] The fact that most European countries of importance, France, Italy, Germany, Austria and Russia, were in the process of increasing their duties, incited further agitation.[8] Proposals favorable to increased tariffs were advanced in Parliament. Moreover, the Minority Report of the Royal Commission to inquire into the causes of commercial and industrial depression, based its conclusions throughout upon a point of view similar to that of the "fair traders." The movement reached a climax in 1887, when, at a Congress of the Conservative Association held at Oxford, a resolution was passed unanimously in favor of "fair trade." This action forced Lord Salisbury, then Prime Minister, into a position which he had formerly hesitated to assume, because of the necessity of Conservative support. In 1887, however, trade suddenly recovered and the issue disappeared. Although it revived again with the passage of the McKinley

[2] Mr. Armitage Smith quoted by Drage, G., *The Imperial Organization of Trade* (Smith-Elder, London, 1911), p. 24.

[3] Ashley, Sir William, *The Tariff Problem* (King, London, 1920), p. 54.

[4] *Ibid.*, p. 52.

[5] For an ample treatment of this movement see Fuchs, C. J., *The Trade Policy of Great Britain and Her Colonies Since 1860* (Macmillan, London, 1905), pp. 188–92.

[6] *Ibid.*, pp. 194–6.

[7] *Ibid.*, pp. 196–201.

[8] See also Drage, *op. cit.*, p. 124.

Tariff in the United States, neither party was willing to adopt "fair trade" as part of its platform.

THE ORIGIN AND SPREAD OF COLONIAL PROTECTIVE TARIFFS

Prior to and including the period which has just been traced, Great Britain's attitude toward her colonies had been curiously apathetic.[9] Not since the last of the eighteenth century had more than indifferent attention been directed to their affairs. As a matter of recorded fact, many statesmen manifested a willingness, even a desire, to abandon them altogether as unprofitable.[10] Parliament was neglectful of their welfare, while public interest could be diverted from problems of proximate interest to the remote questions of colonial concern only on extraordinary occasions.[11] It was commonly expected by some that the colonies would sooner or later secede from the Empire.[12] Doubt as to their commercial value was also prevalent, particularly at the cost of eternal coercion and struggle. Self-government grants, consequently, were readily assented to by Parliament; and, save in the case of the Australian Enabling Act of 1850, there were no legal restrictions placed upon the tariff enactments by the self-governing dominions.[13] Evidently, the possibility of colonial tariffs was not considered seriously by British leaders.

It was not long, however, before the growing spirit of independence among the more aggressive colonies resulted in tariff legislation. A tariff act passed by the legislature of the United Provinces of Upper and Lower Canada went into effect in 1858, and was the logical result of her freedom to control her own affairs. A second act was passed in 1859, despite futile protests from interested British business groups,[14] and the free trade propaganda of the Colonial Office. Other colonies were shortly engaged in the process of tariff building. In 1871, after a short struggle with the British Colonial Office and Parliament, the Australian colonies succeeded in establishing tariff laws.[15] In South Africa, a gradual recognition of a community of commercial interests finally bound the various colonies into a customs union (1889), lacking only the coöperation of Transvaal and Natal, the latter joining in 1898.[16] "One after another," writes Mr. E. Porritt of this movement, "their legislatures enacted tariffs with comparatively high protectionist duties, duties that until 1897 were imposed alike on manufactures of British or non-British countries."[17] The confident expectation that free trade would become the established commercial policy of the Empire, which prevailed in Downing Street at the time when the old system was finally destroyed, thus, failed to be realized.[18]

THE EARLY COLONIAL CONFERENCES AND THE MOVEMENT FOR IMPERIAL PREFERENCE

Toward the end of the century, British manufacturers became accustomed to the tariff barriers imposed by the colonies and protests against trade obstacles practically ceased.[19] A new attitude toward the colonies was rapidly developing. More and more,

[9] See Mr. E. Porritt's exhaustive study on this question, *The Fiscal and Diplomatic Freedom of the British Overseas Dominions* (Clarendon Press, Oxford, 1922), Parts V and VI, pp. 283–397.

[10] *Ibid.*, pp. 296–399.

[11] *Ibid.*, pp. 323–99.

[12] *Ibid.*

[13] *Ibid.*, pp. 61–9.

[14] *Ibid.*, pp. 41, 85, 98 and 384–5.

[15] *Ibid.*, p. 100.

[16] Bruwer, A. J., *Protection in South Africa* (Univ. of Penna., Doctoral Dissertation, Philadelphia, 1923), pp. 67–107.

[17] Porritt, *op. cit.*, p. 66.

[18] *Ibid.*, p. 67.

[19] *Ibid.*, pp. 400–1.

investments in colonial undertakings were absorbed by the London financial market. Emigration to the colonies steadily increased. Educational work by the Royal Colonial Institute and the propaganda of the Imperial Federation League contributed to the awakening of popular interest. Still further attention was attracted to the colonies by the fact of renewed colonial expansion on the part of other European governments, and by the growth of tariff barriers on the continent.

Lord Salisbury, the Prime Minister, being sympathetic toward this general interest, and urged by a deputation of the Imperial Federation League, called a meeting of colonial representatives for an interchange of knowledge.[20] Subjects of Imperial defense, and the promotion of commercial and social relations were scheduled to be discussed. Representation was to be quasi-official only. Thus was planned an organization destined to become of great significance as a medium through which Empire interests could be advanced. By means of it was made possible a new sort of Imperial political pressure which was to have an important influence over future British policies. Of the subtle forces tending to shift Great Britain's traditional free trade policy, perhaps there is none more important than the Imperial and Colonial Conferences. At least, we find in them the initial pressure for the Imperial preference movement which has come to play such a heavy rôle in the construction of all Empire tariff schedules.

The 1887 Conference, being purely informal, could pass no resolutions upon subjects discussed. It is a safe observation to make, nevertheless, that, had there been, foremost among them would have been a vigorous one in favor of an Imperial preference tariff system. Enthusiasm waxed strong from the introduction of the subject, even though the Canadian delegates were non-committal and the attitude of the Victorian representatives was tinged with scepticism.[21]

The "seed of ideas which had been sown in 1887" proceeded to germinate in the various colonies. In Canada, particularly, the issue came to a head over the proposal for unrestricted reciprocity with the United States, as against closer union with the Empire.[22] As a result of this struggle, Canada petitioned the Crown requesting the termination of the treaties with Belgium and Germany, which forbade the British colonies from levying higher duties on the imports of those countries than on corresponding imports from Great Britain. It was entreated further, that, in the future, no commercial treaty should be made binding on any colonial government without its express consent. Thus, the attitude of Canada on preference finally was made definite; she required either a position where she could take advantage of her membership in the Empire, or else she desired to go her own way as an independent nation.

In view of this, when, through Canadian efforts, the Colonial Conference of 1894 met at Ottawa, it was natural that discussion should center on the general question of Empire trade, although the ostensible purpose of the Conference was much narrower; *i.e.*, the consideration of trade relations between Canada and Australia and the promotion of the Pacific cable.[23] Out

[20] Jebb, R., *Imperial Conferences* (Longmans-Green, London, 1911), Vol. I, pp. 7–9.

[21] Sir Samuel Griffith, Prime Minister of Queensland, introduced the subject and was ardently supported by Mr. Joseph Hofmeyer, of Cape Colony. See either *Ibid.*, pp. 64–77, or *Proceedings of the Colonial Conference, 1887* (C. 5091), pp. 462–3 and 463–8.

[22] Jebb, *op. cit.*, p. 165–6.

[23] *Ibid.*, p. 167.

of the discussion came two resolutions, "speedily and unanimously passed," requesting the Imperial Government to take steps to terminate existing treaties which operated to prevent tariff preferences among the colonies; and also to pass legislation enabling the dependencies of the Empire to enter into agreements of commercial reciprocity.[24] Other resolutions affirmed the "practical possibility" and even the "advisability" of an Imperial fiscal system.[25]

MR. JOSEPH CHAMBERLAIN AND THE COLONIAL CONFERENCES OF 1897 AND 1902

Shortly after the events just narrated, Lord Salisbury returned to power, and Mr. Joseph Chamberlain, a prominent Conservative statesman with a pronounced imperialistic bias, chose the portfolio of the Colonial Secretary as his part in the new Government, even though this office had been deemed of secondary importance hitherto. Mr. Chamberlain had taken considerable interest in colonial development, and believed that the British Government should take every advantage to bind the colonies to the Crown, even with the view of ultimate federation.[26] The establishment of commercial union he considered to be the first step. Consequently, little surprise was evinced when he threw open the Conference of 1897 to an unreserved discussion of the question of Imperial trade relations. Nor, further, when he advised the Conference that, if it thought wise, the Crown would consider the termination of the Belgian and German treaties.[27] Resolutions passed by the visiting Premiers agreed to consider with their governments the problem of preference, and requested the British Government to terminate the above-mentioned treaties.[28]

The response of the Crown to their wishes with respect to the treaties was immediate, for it was shortly made public that they had been officially abrogated.[29] It was stated further that, after July 30, 1898, nothing would remain in any of Great Britain's treaties to stand in the way of preference grants on the part of the colonies in favor of United Kingdom produce. With this announcement was also a warning regarding the possible extension of the "most-favored nation" clause in the event of preference grants to foreign nations. The Colonial Premiers were thus able to return to their respective legislatures with a distinct concession from the mother country. The Colonial Secretary, while wholly sympathetic, made it clear, however, that, whether or not there could ever exist sufficient political demand for preference in Great Britain, must depend largely on the colonies and the effective demands of their citizens.

It is doubtless true that there was little enthusiasm of a popular nature in many colonies. In Canada, where

[24] Jebb, *op. cit.*, pp. 167–71.

[25] *Ibid.*, pp. 172–88. It is interesting to note, in this connection that Lord Jersey, the British representative, although not a supporter of the Liberal Government which sent him, stated in his report to the Colonial Office that sentiment alone could never hold together the British Empire, and suggested that the solution lay in Britain's power to change the course of trade in such a way as to bind the colonies to her. Lord Rippon, the Colonial Secretary, cautiously and firmly replied to this report and to the Conference resolutions with a careful exposition of the principles of free trade, and with a statement that the Government could not terminate its treaties with Belgium and Germany. Full fiscal liberty, however, was granted by the Crown to the Australasian colonies (Canada and South Africa already possessing it). *Ibid.*, pp. 231–7.

[26] *Ibid.*, pp. 303–11.

[27] *Proceedings of the Colonial Conference, 1897* (C. 8596), pp. 10–11.

[28] *Ibid.*, pp. 14–5.

[29] *Ibid.*, p. 15.

preference had been granted just before the Conference, there may have been more than elsewhere. In South Africa and Australasia other issues were paramount. The insignificance of preference as a popular political issue is confirmed by the fact that no further preferences were adopted by any colony in compliance with the second resolution. Nor were any even seriously proposed. Meanwhile, the British Government itself was shortly engaged in the colonial war in South Africa.

New developments appeared in the 1902 Conference. Opened as it was by Mr. Chamberlain with a strong Imperial appeal, and the declaration that the demand for closer union could not originate with the mother country, the Conference delegates came forward with some definite offers for the preferential treatment of British goods.[30] In addition, the principle of reciprocal preference was affirmed in a group of strong resolutions, and the premiers were requested to take up necessary measures with their respective Governments.[31] Finally, Canadian delegates presented a further memorandum to the Conference requesting the United Kingdom to reciprocate her preference grants by tariff exemptions on Canadian food, for which privilege she was ready to extend her existing preference allowance.[32] Moreover, the memorandum warned that if the Imperial Government rejected the principle, and if the principle were not acceptable to the other Colonial Governments, Canada would be forced to act as her interests dictated.

THE REVIVAL OF FISCAL CONTROVERSY AND THE CHAMBERLAIN CAMPAIGN

At that time, there existed in the British Budget certain duties on foreign corn and flour which had been established to raise revenue for the South African War. The Canadian Ministers had chosen a strategic moment to place their memorandum before the Imperial Government. Certainly the issue was clearly defined, whatever the value of the preferences offered. Such demands by the colonies were exactly what Mr. Chamberlain had announced to be the conditions necessary for his Government to consider seriously fiscal reform. When the British Government failed to take up the matter and the corn duties were repealed by the Budget in the following spring, colonial leaders probably were offended by what appeared to be "a slap in the face" from the professedly imperialistic party in Britain.[33] Mr. Chamberlain, while forced to drop his proposals temporarily, on May 15, 1903, brought the matter to the attention of his Birmingham constituents, reopening by this act, the "floodgates of controversy."[34]

[30] See Mr. Chamberlain's opening address to the Conference. *Proceedings of the Colonial Conference, 1902* (Cd. 1299), pp. 5–7, or Jebb, *op. cit.*, pp. 352–7; and the preference offers of various colonies, *Conference Proceedings*, pp. 35–6, or Jebb, pp. 366–7. These latter are as follows:

Canada.—The existing preference of 33⅓%, and an additional preference on lists of selected articles; (a) by further reducing the duties in favor of the United Kingdom; (b) by raising the duties against foreign imports; (c) by imposing duties on certain foreign imports now on the free list.

Australia.—Preferential treatment not yet defined as to nature and extent.

New Zealand.—A general preference by a 10% allaround reduction of the present duty on British manufactured goods, or an equivalent in respect of lists of selected articles on the lines proposed by Canada.

The Cape Colony and Natal.—A preference of 25% or its equivalent on dutiable goods other than specially rated articles, to be given by increasing the duties on foreign imports.

[31] *Conference Proceedings, op. cit.*, p. 36.

[32] *Ibid.*, p. 36–8.

[33] Jebb, *op. cit.*, Vol. II, p. 45.

[34] In this connection, see Hewins, W. A. S., *Trade in the Balance* (Allan, London, 1924). Prof. Hewins was intimately associated with Mr. Chamberlain in this campaign as head of his Tariff Commission. He continues to be an advocate of tariff protection.

When the question came before the House of Commons, Mr. Balfour, the Prime Minister, declined to support unequivocally Mr. Chamberlain's proposals. He took a middle stand, however, acknowledging that the country was no longer in the position occupied by it when free trade was adopted, and admitting that a tariff might be useful for purposes of retaliation and bargaining. There was, perhaps, good basis for this position. Upon the continent had grown up a series of commercial treaties among protective countries, from which Great Britain had been excluded and which were due to expire about 1904 to 1906. The threat of a tariff might have regained a more favorable position for Great Britain among her rivals.

Rather than embarrass Mr. Balfour, under the circumstances, Mr. Chamberlain resigned from the Cabinet and gave himself to propagandizing for his cause.[35] Five other Ministers of free trade bias also resigned and the campaign began in earnest. The Tariff Reform League was organized at Birmingham, while the Tariff Commission originated by Mr. Chamberlain proceeded to draw up a "scientific" tariff. Mr. Chamberlain traveled over the country preaching the advantages of fiscal reform to local industries, and planning to force an election on the issue.[36] Mr. Balfour, however, managed to maintain such an even balance in his fiscal views that "each section of his party could interpret them in its own favor."[37] The election was delayed and the campaign went on, with the Free Trade Union and the Cobden Club carrying on an extensive counter-propaganda.

The difficulties facing the Balfour Government during these years must have been very great. Chamberlain's efforts were splitting the party. Save for the fact that a party division at this time would have allowed the Liberals to come into power with their program of Irish Home Rule, there was little to hold the Unionist party together. A crisis finally came and Mr. Balfour tendered the resignation of his Ministry. In the general election which followed, free trade was the dominant issue. The Unionists met with overwhelming defeat, and the Liberal party came into power with Sir Henry Campbell-Bannerman at its head.

Although decisively defeated, tariff reform did not relinquish its place in the political arena. The Tariff Reform League continued its activities, as did likewise Mr. Chamberlain's Tariff Commission. Fuel was added to the controversy by the publication of a free trade memorandum on "The Fiscal Policy of International Trade," prepared by the late Professor Alfred Marshall, the eminent economist, as a Parliamentary Paper.[38]

Mr. Chamberlain, though forced by ill-health to retire from active participation, retained a lively interest in the problem. Mr. Balfour, finally converted to the former's ideas on fiscal reform, in 1909 declared himself a firm believer.[39] His new program advocated a duty on wheat, although he pledged that none would be levied on cotton and rubber. He argued further that tariff reform was essential to secure the home market from unfair

[35] For a short, vivid description of the campaign see Hirst, *op. cit.*, pp. 49–56.

[36] Hewins, *op. cit.*, p. 17. Mr. Hewins states that in October, 1903, some eminent opponents informed him that Chamberlain could carry the nation.

[37] Hirst, *op. cit.*, p. 54.

[38] While denying the need for tariff reform, Marshall did advocate the use of any and all financial weapons in reprisal against the refusal of the "most-favored nation" privilege to British trade. Parliamentary Papers, 1908, 321.

[39] Drage, *op. cit.*, pp. 155–6.

competition. The general election of 1909, which the Conservatives forced on the issue of Mr. Lloyd George's Budget, failed, however, to reseat them.

Shortly after the election, opposition developed to the leadership of Mr. Balfour, and, in November, 1911, he was supplanted by Mr. Bonar Law. The Unionist party now gave themselves to a complete scheme of protection and Imperial preference. Mr. Austen Chamberlain reported that the Conservative party proposed to put a 5 per cent duty on foreign foodstuffs and an average of 10 per cent on foreign manufactures. At the party meeting in November, 1912, a movement successfully took place to remove the referendum pledge of Mr. Balfour, which had promised to refer the principles of the tariff to a popular vote.[40] At the same meeting, Mr. Bonar Law declared that tariff reform was the party's most constructive plank, although food duties were involved. Later opposition which developed within the party forced the postponement of the proposal of food taxes.

This is the situation in which we find tariff reform just prior to the period of the War. The Conservative Party had committed itself irrevocably to tariff reconstruction, that is, as irrevocably as a political party can. Public interest in the question waned just before 1914 and was overshadowed by the problem of Ireland. As for industry and trade, since 1905, imports and exports had shown a lively upward trend. Dark forecasts about the retrogression and decline of Great Britain's trade no longer were capable of arousing great interest. Fiscal reform was in the background and destined to remain there until the exigency of a new and complex emergency should force it out.

[40] Hirst, *op. cit.*, pp. 58–9.

THE IMPERIAL CONFERENCES OF 1907 AND 1911

We are not ready to pass on to the developments of the War period until we have paused to consider the incidents of the two Imperial Conferences, as they came to be called, which took place in 1907 and 1911. The first, scheduled for 1906, was not held until the following year in order to allow the new Colonial Secretary, Lord Elgin, time for preparation. According to past custom, members were invited to submit subjects for discussion. The inevitable transpired; questions of preference and Imperial organization were among the most common ones presented.[41] It almost appeared that the Conference would "redound to the advantage of the opposition party, owing to the evident prominence of preference."[42] Its treatment in the Conference was characterized largely by debate, with the Liberal Ministers on the defensive before the British public with its divided sentiment. They were candid about having pledged themselves against "countenancing the smallest departure, no matter how trivial in itself, from the principles of the existing fiscal system."[43] Any concession to the Conference would have invalidated their platform and discredited them before the country.

Nevertheless, there were some significant offers made by Colonial Ministers. Although the proposal for an intercolonial "most-favored nation" arrangement, introduced by Mr. Deakin, the Australian Premier, was quietly quashed, definite offers of additional preference for reciprocation on Great Britain's part were made by Australia, New Zealand and South Africa, while

[41] Jebb, *op. cit.*, Vol. II, pp. 27–32.
[42] *Ibid.*, pp. 64–5.
[43] *Ibid.*, pp. 181–7.

Newfoundland and Transvaal representatives agreed to subscribe to the 1902 resolutions.[44] Only the Indian representative opposed the idea.[45] The discussion ended by the passage of resolutions, of which the first, proposed by the Liberal Ministers, was simply a reaffirmation of the old principle of fiscal freedom, well-couched in diplomatic language, acknowledging the justice of permitting the special requirements and conditions of each member of the Empire to govern its contributions to Imperial commercial relations.[46] Two other motions, one of general nature and the other a strong reaffirmation of the 1902 resolutions were passed, the British ministers, of course, dissenting from the latter.[47]

In the 1911 Conference two steps were taken which may be regarded as victories for the Colonial delegates. The first was the acceptance by the Conference of a Canadian proposal that His Majesty's Government should open negotiations with several foreign governments in order to secure liberty for any of those who might choose to withdraw from the operation of certain commercial treaties.[48] No invalidation of the treaty regarding the rest of the Empire was desired. What was sought was such release from outside obligations as would enable the extension of intra-Empire preference arrangements, and also the privilege of the dominions to erect higher protective duties against whomever they desired. The Crown's acquiescence was merely a diplomatic step, for its acceptance contained the condition that new treaties could be negotiated to replace existing ones, a condition which required the accession of the other parties, and was impossible of attainment.

The second resolution, passed unanimously, was by far the more significant.[49] It proposed a Royal Commission representing all sections of the Empire to investigate and report upon the natural resources of each part of the Empire, the facilities for production and trade, and the effect of existing commercial legislation. On the whole, such a resolution could cause the Liberal Government no embarrassment. Yet it may be considered a colonial victory because it committed the Liberal Ministers to a more decided Imperial policy than they had been willing to assume heretofore.

It is plainly very difficult to interpret the influence these Conferences may have had upon the Liberal Home Government. The 1907 Conference was its initial contact with that sort of political pressure. It is not unreasonable to suppose that an ineffaceable impression was made by a realization of the vast resources and population represented at the Conference table.[50] This impression may have prepared the way for its war-time protectionist compromise. Whatever the possibilities on that score may be, one thing only was certain, the Crown's position for the time on the question of trade relations with the colonies was clearly

[44] Jebb, *op. cit.*, Vol. II, pp. 187–218.

[45] He was a delegate from the Indian Office, rather than India, and a Liberal supporter, *ibid.*, pp. 219–22.

[46] *Proceedings of the Imperial Conference, 1907* (Cd. 3523), pp. 429–38.

[47] *Ibid.*, pp. 439–40 and 429.

[48] *Proceedings of the Imperial Conference, 1911* (Cd. 5745), pp. 333–9.

[49] Likewise a Canadian suggestion offered as a compromise to a stronger Australian resolution reaffirming the 1902 preference resolutions, to which, of course, the Home Government could not assent. *Ibid.*, pp. 339–44.

[50] It is significant to note here that Mr. Richard Jebb, the authority on Imperial Conferences, observes a certain sympathy in Mr. Lloyd George's speeches to the preference idea and Imperial movement. Party obligations, asserts Mr. Jebb, prevented him from being more generous in his attitude. Mr. Jebb wrote in 1911. See his work, Vol. II, pp. 233–40.

defined. It succeeded in checking effectively, though only temporarily, further advances toward preferential protection.

THE EXTENT OF PREFERENCE GRANTS BY THE SELF-GOVERNING DOMINIONS, 1900 TO 1914

It is illuminating to note briefly, before leaving this period, the extent to which tariff preferences on British manufactures had come to be granted by the various colonies. Canada, for instance, had followed up her original preference grant of 1897 with an additional grant in 1900, extending to one third of the existing duties. Complaints from Canadian manufacturers brought a reduction in this preference in 1904.[51] In 1907, uniform percentage preference was abandoned, and specified preference rates were substituted showing variously a greater or less reduction than one third on British goods. In addition, an intermediate tariff for purposes of negotiation was adopted.

Following Canada's example in this respect, New Zealand, in 1903, added a surtax to certain imports, some thirty-eight items, from foreign countries.[52] This number was increased to one hundred and ninety-four in 1907. Under a reciprocity clause in the 1903 Act, she entered into a preferential arrangement with South Africa in 1906, but reached no other agreements either with foreign countries or other colonies.[53] In Australia, however, a preferential tariff did not make its appearance until 1908, although she entered into a reciprocal arrangement with South Africa two years before.[54] The basis of her tariff preference was, as with New Zealand, protection of her own industries first. Consequently, preferences were created by increasing the duties on imports from other countries. Notwithstanding this, it was reported by the Dominions Royal Commission that throughout Australasia there existed a marked enthusiasm for the principle.[55]

South Africa, with her Customs Union and her tradition of protection might have been expected to enact a preference tariff at an early date. It was not accomplished, however, without overcoming some opposition, especially that of Cape Colony.[56] Only through the efforts of Lord Milner, His Majesty's High Commissioner in South Africa, and those of Mr. Chamberlain, was the preference promised at the 1902 Conference, enacted the following year.

The preferences granted by the colonies were unquestionably not large. Most of them were obtained by increasing the duties on foreign produce, colonial industry being amply protected against British products, though some British goods profited by them. Concerning the extent of their influence on Empire trade, there exists no barometer for measurement.[57] As to their effect upon the British fiscal policy, conclusions will be suggested later as the reader acquaints himself with

[51] Culbertson, W. S., *International Economic Policies* (Appleton, N. Y., 1925), pp. 161–2.

[52] *Ibid.*, pp. 170–1.

[53] *Ibid.*, p. 176.

[54] *Ibid.*, pp. 165–6.

[55] Dominions Royal Commission, *Second Interim Report*, 1914 (Cd. 7210), p. 7.

[56] Bruwer, *op. cit.*, p. 122. The Premier of Cape Colony, however, favored preference at the Colonial Conference of 1902.

[57] The amounts of duty remittances or reductions by the various dominions for the few years prior to the War are suggestive. For example, they were, for Australia, in 1910, in thousand pounds sterling, 972; Canada, 1303; New Zealand, 536; South Africa, 594; and in 1913, for Australia, 1244; Canada, 1573; New Zealand, 760; and South Africa, 628. See in this connection the Dominions Royal Commission, *Second Interim Report*, 1914 (Cd. 7210), p. 7; *Fifth Interim Report*, 1917 (Cd. 8457), p. 7; *Third Interim Report*, 1914 (Cd. 7505), p. 7.

further developments. Unquestionably, some pressure from colonial sources was being felt in Downing Street.

Our procedure up to this point has been to acquaint the reader, as briefly as possible and yet as exhaustively as space has permitted, with the immediate background of the British tariff problem, to the end that a more searching survey of the recent trend toward protection may be made. The following chapter will treat the protectionist developments during the War, and the succeeding one will carry the study up to the present time. Subsequent chapters deal statistically with an analysis of British economic trends and their significance in explaining the late protectionist movement.

CHAPTER II

THE WORLD WAR AND PROTECTION IN GREAT BRITAIN

FOLLOWING the outbreak of the World War, the Asquith Liberal Government early faced difficulties with its program. Having failed to achieve any conspicuous military success, the Government found that political expediency made it necessary to take several Conservative leaders into the Cabinet. The object, it was averred, was to effect a national unity and unanimity, essential to a successful termination of the War. Domestic controversies, in the meanwhile, were to be placed, as Mr. F. W. Hirst states, "in cold storage." With a substantial majority in the House of Commons, and a War of unprecedented proportions going on, it did appear that the issue of protection and preference would be obscured.

Several circumstances operated to vitiate this possibility. In the first place, British industry was finding itself tremendously handicapped by the lack of certain essential products whose production was controlled by enemy interests. The military handicap of being so thoroughly a dependent industrial nation was forcefully brought to the attention of statesmen, officials and business men. In the second place, there was an inevitable and universal realization of certain reputed economic designs of Germany which were said to be a part of her general war policy. Coupled with this was a growing fear that Germany was preparing to sweep down and destroy all Britain's industry and trade. Then there were the colonies which so patriotically had stood by the mother country in her emergency, placing the latter, however, in a position of very real obligation. Finally, certain problems of expediency arose necessitating fiscal action for temporary alleviation.

THE MCKENNA DUTIES OF 1915

The first of the circumstances to be treated here belongs in the last of the above-named categories. In September, 1915, Mr. Reginald McKenna, the Chancellor of the Exchequer, proposed a startling innovation. His Budget contained a 33⅓ per cent duty upon a series of articles, including motor cars, motor cycles and parts thereof, cinema films, clocks, watches, musical instruments, plate glass and hats. He urged in his proposals that goods of such a nature should be taxed from the very outset in order to provide revenue and

to cut consumption which was deemed unnecessary. He denied that it was a question of tariff reform or of protection.[1] His purpose, which so frequently has been misinterpreted, is best set forth in his own words:[2]

> We have to tax now with objects beyond revenue, with objects which are purely temporary, and without regard to the permanent effect upon trade. We must look at the state of our foreign exchange. We must discourage imports. Some of us think that, in ordinary circumstances, imports if excessive will necessarily be discouraged and exports will necessarily increase. But this is not true today. We cannot increase our exports because our capital and labor are otherwise engaged. We have then to look upon the reduction of imports as an object in itself. Then we also have to have strict regard to the necessity of reducing consumption. If, thus, we can by any means of taxation, at one and the same time, reduce imports, and reduce consumption, and bring in revenue, then I think, for the moment at any rate, we may consider to have found an ideal system.

It was also contended in defense of these duties that shipping space would be saved, although this argument could not be advanced for all articles.[3] Of course, the preference proponents were not missing, but such proposals as they made were rejected.[4] As for the length of time that the duties would remain a part of the fiscal system, it was practically promised by Mr. McKenna that they were strictly a war measure and would be discontinued with the passing of the emergency.[5]

[1] *Parliamentary Debates*, Commons, Vol. LXXIV, 1915, Col. 1724–5.

[2] *Ibid.*, Col. 351–2.

[3] Hirst, *op. cit.*, p. 63. Mr. Hirst emphasizes this idea of shipping space economy as an argument for the McKenna duties, though the writer was unable to find any emphasis upon it in the House Debates.

[4] *Parliamentary Debates, op. cit.*, Col. 1749–62.

[5] *Ibid.*, Col. 1724–5.

THE PARIS RESOLUTIONS OF 1916

Concurrently with the adoption of the McKenna duties, in fact since the outbreak of the War, certain suspicions and fears regarding Germany's economic motives had been growing. Business men in general were filled with grave misgivings, and continually disturbed by dreadful apparitions concerning post-war trade. A Sub-Committee of the Advisory Committee to the Board of Trade, conducting an investigation into the condition of a group of minor industries about this time, came to the conclusion that the question of protection was the most important they had to consider. "Practically all the representative firms and associations consulted by us," stated the Report, "asked for a measure of protection."[6] There was a widespread fear, the Committee further noted, that the country would be flooded with German and Austro-Hungarian goods after the War, "sold at any price they would bring with a view to capturing trade hitherto carried on by enemy countries." Business men testified to the Committee that German industries were producing and accumulating stocks preparatory for this purpose.[7]

The Sub-Committee concerned itself with other phases of protection, and in its report urged several recommendations of a revealing nature. If we may interpret them as a rather substantial representation of British business and industrial opinion at that time, some light is shed upon subsequent developments. A portion of the report is well worth quoting in this connection:[8]

> We are of the opinion that, when the national supplies of certain manufactured ar-

[6] Committee's *Report*, 1916 (Cd. 8275), p. 11. Of course, some of these industries are those which suffered most from pre-war competition.

[7] *Ibid.*, p. 11.

[8] *Ibid.*, p. 16.

ticles, which are of vital importance to the national safety or are essential to other industries, have fallen into the hands of manufacturers and traders outside this country, British manufacturers ready to undertake the manufacture of such articles in this country should be afforded sufficient tariff protection to enable them to maintain such production after the War.

With reference to the strongly expressed opinion of many of the witnesses that the enactment of protective duties on the industries other than those referred to in the preceding paragraph, which have formed the subject of our inquiry, is essential to their maintenance, we wish to report that in view of the following considerations:

(a) That there exists a strong desire to respond to the feelings of our Dominions in favor of an Imperial Preference in trade, and that there is also a strong desire to arrange preferential trading with those who are our Allies in the present War, and

(b) That the present high direct taxation tends to raise the rate of interest on money, and cheap abundant capital for the employment of their labor is of the greatest importance to the working classes,

It will be necessary to impose some widely spread import duties, and we are therefore prepared to recommend that a larger proportion of the revenue be raised by import duties.

We are of the opinion that such import duties would go a long way towards satisfying the requests for special protective treatment for the industries which we have under consideration.

It was in the sentiment revealed by this Report that the famous Paris Resolutions originated.[9] The same month in which it was published, January, 1916, a motion was made and passed unanimously in the House of Commons, which called upon the Government "to enter into immediate consultation with the Governments of the Dominions, in order, with their aid, to bring the whole economic strength of the Empire into coöperation with our Allies in a policy directed against the enemy."[10] The Paris Economic Conference followed in June, and passed a series of resolutions, framed in advance by Mr. Walter Runciman, President of the Board of Trade, with the approval of Mr. Herbert Asquith, the Prime Minister; Mr. Walter Long, the Colonial Secretary; and two representatives of the Dominions, Mr. W. M. Hughes, and Sir George Foster. The resolutions included recommendations for Allied economic measures during the period of the War; during the period of reconstruction; and lastly, permanent measures. In them, among other things the Allies agreed to take all necessary steps to make themselves independent of the enemy countries, so far as raw materials and manufactured products, as well as financial, commercial and maritime organization were concerned.[11] Accordingly, almost any methods could be applied in carrying out the agreement, as the subsidizing, direction or control of enterprises by governments; financial assistance for the encouragement of scientific and technical research, and the development of national industries; the application of customs duties or prohibitions of a temporary or permanent character, or a combination of them all. Whatever the method, the object desired was such increased production within Allied territories as to enable them to develop and maintain their economic position independently of enemy countries.

Referring to these resolutions shortly after, Mr. Asquith announced in the House of Commons that they had been adopted as part of the Government's policy, which he hoped met with the approval of Parliament.[12] In defend-

[9] Hewins, *op. cit.*, pp. 37–40.

[10] *Ibid.*, p. 38.

[11] Paris Economic Conference, *Resolutions*, 1916 (Cd. 8271).

[12] *Parliamentary Debates*, Commons. Vol. LXXXV, 1916, Col. 340–1.

ing this action, he gave classic expression to the general trepidation current at the time. He declared:[13]

> The War has opened our eyes to the full meaning and manifold implications of the German system of economic penetration, and commercial and financial control of vitally important industries and to the use to which vantage ground gained by this system can be put in war. It is difficult—indeed, I think it is impossible—to believe that Germany would not be animated by the same spirit and policy when the War is over, and that she will start, be it observed, with certain very considerable advantages. They are already organizing their industry—and do not let us be blind to this—for an attack on our Allied markets and for a vigorous and, if possible, victorious competition in neutral markets. It is then in our view—when I say our view I mean the view of the Allied Powers—necessary to make thorough preparations for the coming peace, and the Paris Economic Conference and the Resolutions passed there represent the attempt of the Allies to decide the general lines on which that preparation should proceed.

Adoption of the resolutions as part of the Government's policy was not without opposition, because Mr. Asquith had pledged that the British delegates would return from the Paris Conference uncommitted.[14] The Government announced, however, that no action would be taken immediately, but that a Committee had been appointed under the Chairmanship of the late Lord Balfour of Burleigh, to investigate and present definite means of carrying out the suggestions of the resolutions.[15] Thus, the question of Parliamentary approval was postponed until the report from this Committee was received, and definite proposals were ready to be made.

[13] *Parliamentary Debates,* Commons. Vol. LXXXV, 1916 Col. 333.

[14] *Ibid.,* Col. 380–2.

[15] *Ibid.,* Col. 339.

THE LORD BALFOUR OF BURLEIGH COMMITTEE

The Committee, known as the Committee on Industrial and Commercial Policy after the War, was composed of both Conservative and Liberal members. It began its work at once and shortly issued an interim report, which appeared just before the meeting of the Imperial War Conference, a Conference consisting of all the Colonial Premiers. The Committee felt, as they stated in an accompanying letter to the Prime Minister, that, though acts in restraint of trade are distasteful in the abstract, Imperial interests made a serious attempt to meet the declared wishes of the dominions and the colonies very desirable.[16] The sacrifices made and the services rendered, it was further stated, made the time particularly appropriate for the declaration of such a policy. Then, too, the Committee felt that the recovery of trade lost during the War, the securing of new markets, and the consolidation of Empire resources could best be facilitated throughout the Empire, by a system of mutual protection. Consequently, the Committee presented the following resolutions:[17]

> 1. In the light of the experience gained during the War, we consider that special steps must be taken to stimulate the production of food-stuffs, raw materials and manufactured articles within the Empire wherever the expansion of production is possible and economically desirable for the safety and welfare of the Empire as a whole.
>
> 2. We therefore recommend that His Majesty's Government *should now declare their adherence to the principle that preference should be accorded to the products and manufactures of the British overseas Dominions, in respect of any Customs Duties now or hereafter to be imposed on imports into the United Kingdom.*

[16] *Interim Report,* 1917. (Cd. 8482), p. 1.

[17] *Ibid.,* p. 3. (Italics are the writer's).

3. Further, it will, in our opinion, be necessary to take into consideration, as one of the methods of achieving the above objects, *the desirability of establishing a wider range of Customs Duties which would be remitted or reduced on the products and manufactures of the Empire and which would form the basis of commercial treaties with Allied and Neutral Countries.*

THE RESOLUTIONS OF THE IMPERIAL WAR CONFERENCE, 1917

The Imperial War Conference, which had been called for the purpose of securing closer co-operation within the Empire in pushing the War, met early in the spring of 1917. After due deliberations, of which but smatterings are published, a resolution was passed by the Conference favoring the establishment of an Imperial preference system. Since the resolution had previously met with the unanimous approval of the Imperial War Cabinet, consisting only of Imperial Prime Ministers, its adoption in reality was mere reaffirmation.[18] It represented, as passed, not only an expression of opinion by the Colonial representatives, as had former resolutions of Imperial Conferences, but also the expression of an opinion by the British Government. Thus, Great Britain tied herself definitely to a policy of Imperial preference.

This resolution which Mr. Hewins describes as the "key" resolution to future developments of policy, declared in definite terms that "the time has arrived when all possible encouragement should be given to the development of Imperial resources, and especially to making the Empire independent in respect to food supplies, raw materials, and essential industries." [19] The resolution contained a clause, moreover, which expressed unequivocal approval of the principle that each part of the Empire should give especially favorable treatment and facilities to the produce and manufactures of other parts of the Empire, with due regard, of course, for the interests of the Allies. In addition, arrangements should be made to induce British emigrants to settle within the Empire. Concerted Imperial action, finally, was deemed necessary to arrange in the future for an adequate food supply and its transportation, and also for the control and economical utilization of resources essential for national purposes.

Since this action was concurred in by the British Government, the next step was the working out of a practical preference plan. Mr. Long, the Colonial Secretary, announced in the House of Commons, a Cabinet Committee to inquire and report on the methods required to render the resolution effective.[20] This Committee, called the Committee on the Trade Relations of the United Kingdom within the Empire, considered a group of subjects such as: (1) preference both by means of tariff and administrative measures, (2) the position of commercial treaties in view of conditions arising out of the War; (3) the resources of the British Empire.[21]

THE LORD BALFOUR OF BURLEIGH COMMITTEE, FINAL REPORT

In the meantime, the final report of the Balfour of Burleigh Committee was received, recommending a comprehensive change in the fiscal policy. These recommendations are the culmination of the war movement toward tariff protection. Their inclusion here is, therefore, pertinent:[22]

(1) The producers of this country are

[18] Hewins, *op. cit.*, pp. 41–2.

[19] *Proceedings of the Imperial War Conference, 1917* (Cd. 8566), pp. 114–5.

[20] *Parliamentary Debates*, Commons, Vol. XCVII, 1917, Col. 1003.

[21] Hewins, *op. cit.*, pp. 43–4.

[22] Committee on Commercial and Industrial Policy after the War, *Final Report*, 1918 (Cd. 9035), p. 52.

entitled to require from the Government that they should be protected in their home market against "dumping" . . . , and against the introduction of "sweated goods." . . . We agree that it will often be difficult to distinguish between "dumping" and between cheap production and "sweating," but it will be the duty of our trade representatives in foreign countries to investigate and report on these matters, and reliance must be placed upon the manufacturers in this country, so that the operations of the customs officials may be intelligently directed to stop these unfair forms of trade.

(2) Those industries which we have described as "key" or "pivotal" should be maintained in the country at all hazards, and at any expense. No ordinary economic rules apply to the situation of these minor but important industries. They must be kept alive, either by loans, by subsidies, by tariffs, or Government contracts, or in the last event, by Government manufacture. They will necessarily be subject to Government supervision.

(3) As regards other industries, protection by means of customs duties or Government assistance in other forms should be afforded only to carefully selected branches of production which must be maintained either for reason of national safety, or on the general ground that it is undesirable that any industry of any importance to our economic strength and well-being, should be allowed to be weakened by foreign competition, or brought to any serious extent, in this or other ways, under alien domination or control.

(4) Preferential treatment should be accorded to the British Overseas Dominions and Possessions, in respect of any Customs Duties now, or hereafter, to be imposed in the United Kingdom, and consideration should be given to the expediency of other forms of Imperial Preference.

(5) As regards our commercial relations with our present Allies and with Neutrals, the denunciation of existing commercial treaties for the purpose of affording special treatment to such of our Allies or of the Neutrals as might be disposed to make reciprocal concessions, is unnecessary and unexpedient. But the present opportunity should be taken to endeavor to promote our trade with the Allies, and consideration should be given to the possibility of utilizing for purposes of negotiation with them and present Neutrals, any duties which may be imposed in accordance with the principles which we have laid down before.

In addition to these recommendations, a Special Industries Board was proposed, to work with the Board of Trade, in determining essential industries which should otherwise be maintained on general grounds of safety or economic desirability.[23] Some assistance to such industries ought to be extended, it was felt, but it was admittedly difficult to determine just what industries should be included. The Committee suggested that the list might possibly include, indeed, appeared to them to include, the heavy iron and steel industries, the numerous branches of manufactured iron and steel goods; the engineering trades, including electrical and motor engineering; the production of a considerable number of non-ferrous and ferro-alloys; ship-building; many branches of the chemical trades; the textile trades, almost as a whole; the manufacture of various classes of rubber goods, especially tires; and the leather industries.[24] Nearly every important British industry is included in one of these categories; and hence, falls within the scope of this recommendation, according to the Committee itself.

As a matter of fact, most of the industries in question did feel that they should be the recipients of protection under this head. The accompanying table, Table I, which will merit the reader's careful attention, summarizing the recommendations of various Departmental Committees appointed by the Board of Trade to consider the position of some of these industries fol-

[23] Committee on Commercial and Industrial Policy after the War, *Final Report*, 1918 (Cd. 9035), p. 52.

[24] *Ibid.*, p. 44.

TABLE I—GIVING SUMMARIES OF THE STATEMENTS AND RECOMMENDATIONS WITH REGARD TO PROTECTIVE TARIFFS FOUND IN THE REPORTS OF THE VARIOUS DEPARTMENTAL COMMITTEES APPOINTED BY THE BOARD OF TRADE TO CONSIDER THE POSITION OF CERTAIN INDUSTRIES AFTER THE WAR

Industry	The Position of the Industry on Protective Tariffs as Evidenced by the Reports	Amount and Type of Tariff Suggested
Electrical Trades [1]	Many witnesses expressed the view that protection would be necessary after the War	Duties should be sufficiently high to afford ample protection. Measures should be enacted against dumping
Engineering Trades [2]	Majority of Committee believed tariff would be necessary	No definite suggestions, save with regard to preference which ought to be large enough to induce reciprocal treatment
Iron and Steel Industries [3]	Committee believed that safeguarding would be necessary. Feeling unanimous in industry for this sort of protection. Also a general protest against dumping	Amount should be large enough to safeguard and protect industry. Preferences large enough to induce reciprocity should be given. Dumping should be prevented
Shipping and Ship-building Trades [4]	Committee reported industry as opposing duties on any article used by them, urging need of freedom in making purchases. Sentiment in favor of anti-dumping legislation	
The Textile Trades: (a) The Cotton Industry [5]	Little demand in this industry for any change in the present policy. Fear increase of production costs if duties imposed	
(b) The Woolen Industry [5]	Differences of opinion among producers of woolen and worsted goods for men. Dress goods producers favor protection	Dress goods producers desire a small tariff on yarns and a higher one on dress goods
(c) The Carpet Industry [5]	Large majority of producers in this industry seem to favor protection	A tariff as high as 20 per cent suggested, with preference for the Dominions and Allies
(d) The Silk Industry [5]	Practically a unanimous request for a tariff. Said to be an "infant" industry	Varying duties suggested from 12 per cent to 40 per cent with Empire goods free
(e) The Jute Industry [5]	In favor of protection, especially a type of export duties profitable to itself	An export duty on jute leaving India with a refund in favor of Empire destinations

TABLE I—*Continued*

Industry	The Position of the Industry on Protective Tariffs as Evidenced by the Reports	Amount and Type of Tariff Suggested
(f) The Linen Industry [5]	A general feeling in favor of protective duties	No suggestion save that distinction be made between Allied and enemy countries
(g) The Hosiery and Fabric Glove Industry [5]	A practically unanimous demand for tariff protection in the hosiery industry. Cotton hosiery and gloves ask for protection to establish large scale production (infant industry)	No particular amount of tariff duties suggested
(h) The Lace Industry [5]	Same situation as above. Machine lace industry in need of protection to establish large scale production	No particular amount of tariff duties suggested

[1] Departmental Committee Appointed by the Board of Trade to Consider the Position of the Electrical Trades After the War, *Report*, 1918 (Cd. 9072), pp. 8, 9 and 12.

[2] Same, Engineering Trades, *Report*, 1918 (Cd. 9073), p. 37.

[3] Same, Iron and Steel Industries, *Report*, 1918 (Cd. 9071) pp. 28–32. Two members of the Committee dissented from the majority opinion that protection would be necessary after the War.

[4] Same, Shipping and Ship-building Trades, *Report*, 1918 (Cd. 9092) pp. 28–9.

[5] Same, Textile Trades, *Report*, 1918 (Cd. 9070), pp. 122–4.

lowing the War, shows us the extent to which this was true.[25] Only one, ship-building, was opposed in any strenuous way to the proposal of tariff protection; most of the others, save cotton, were apparently strongly in favor.[26] The same conviction among business men, that protection following the War would be highly beneficial, had been expressed earlier for certain of the minor industries.[27] Beyond a doubt, a general sentiment was being crystallized among industrialists in favor of fiscal revision, if not in favor of adopting a comprehensive tariff system.

THE IMPERIAL CONFERENCE OF 1918 AND THE CLOSE OF THE WAR

These recommendations of the Balfour of Burleigh Committee did not lead to immediate action on the part of the Government, for it was commonly understood that no action was to be taken until after the close of the War. They were, however, considered by the Imperial War Conference of 1918, and were made the basis of a number of "practical resolutions," in the form of recommendations for consideration by the respective Governments of the Empire.[28] The recommendations constituted a large scheme for the economic

[25] See citations at foot of Table I.

[26] It is significant, perhaps, to point out here that the number of persons employed in the industries favorable to protection was roughly 14 per cent of the total number of persons gainfully employed, in June, 1921. This figure has been obtained from a study of population statistics contained in the Committee on Industry and Trade, *Survey of Industrial Relations*, pp. 403–15.

[27] Sub-Committee to Advisory Committee of Board of Trade, *Report, op. cit.*

[28] Mr. Hewins was Chairman of an Economic Committee of the Imperial War Conference which drafted the recommendations. See his book, *op. cit.*, pp. 44–5.

development of the Empire, and were approved unanimously.[29] The chief concern behind them, according to Mr. Hewins, was Imperial development during the period of reconstruction, the duty of the British being first to set their own house in order. Representatives of the Empire at the approaching Peace Conference could be guided thus in defining their position.[30]

Shortly after the War came to a close, there followed the famous election of 1918, by which Mr. Lloyd George was returned to power at the head of a new Coalition Government. Like its predecessor, it was a compromise, and because of this, did not submit the resolution of the 1917 Imperial War Conference to the House of Commons, as would have been the constitutional procedure.[31] It was clear, however, what position the new Government would take on this question. Mr. Lloyd George had addressed the Lord Privy Seal prior to the formation of his election manifesto:[32]

> I have already accepted the policy of Imperial Preference as defined in the resolution of the Imperial Conference to the effect that a preference will be given on existing duties which may subsequently be imposed. As regards other aspects of this problem, I am prepared to say that the "key" industries on which the life of the nation depends must be preserved. I am prepared to say also that in order to keep up the present standards of production and develop them to the utmost extent possible, it is necessary that security should be given against the unfair competition to which our industries have been in the past subjected by the dumping of goods below the cost of production. Beyond this I should say we must face all of these questions with new eyes, without regard to pre-war views or pre-war speeches. The object which we have in view is to increase to the greatest possible extent production in this country. . . .

[29] *Proceedings of the Imperial War Conference, 1918*, (Cd. 9177), pp. 4–9.

[30] Hewins, *op. cit.*, p. 45.

[31] *Ibid.*, p. 46.

[32] Quoted in *Parliamentary Debates*, Commons, Vol. 114, 1919, Col. 323–4.

THE INTRODUCTION OF PREFERENCE INTO BRITISH TARIFF LEGISLATION

When Parliament met again, it was announced that a bill would be introduced shortly for the prevention of dumping.[33] None appeared and the proposal was forgotten temporarily upon the presentation of the Budget, introduced by Mr. Austen Chamberlain, then Chancellor of the Exchequer. Here it was proposed to allow preferences upon a number of existing duties.[34] The range of duties upon which preference was to be granted was not large, and no proposal was made to increase their number, a procedure which is said to have side-tracked free trade opposition. But Mr. Chamberlain observed with some significance in his Budget speech that: "Though the beginnings be small, there are vast opportunities for the development of British Imperial trade to be secured by promoting that trade along the line of preference."[35] In other words, this was merely, in his conception, a first step. Included in the plan was a preference grant of one-third on the McKenna duties, which were to be continued; a preference grant of one-sixth on tea, coffee, sugar, and motor spirits; and a preference of varying rates upon wines and spirits. The approval of Parliament being gained subsequently, the British Government had given concrete expression, finally, to its war-time admission of the principle of Imperial preference.

THE APPEARANCE OF SAFEGUARDING

Following suggestions which had been made consistently during the War period, for the exclusion of cer-

[33] King's Speech quoted, *Ibid.*, Col. 326.

[34] Budget Speech, *Ibid.*, Vol. 115, Col. 198–9.

[35] Budget Address, *Ibid.*, Col. 195.

tain imports during the years immediately following the cessation of hostilities, in order to afford British industry an opportunity to recover, effort was made by the Coalition Government to continue the controls and embargoes established for emergency purposes. No less than two hundred and sixty classes of goods, writes Mr. Hirst, were either prohibited or were allowed to enter British ports only in restricted quantities under licenses granted by the Board of Trade.[36] This practice was the cause of no little criticism. Lord Parmoor, in the House of Lords, asserted that these embargoes and licenses were illegal. A crisis was reached just before Parliament adjourned, in August, when Sir John Simon announced his intention of importing certain prohibited goods from Spain.[37] A few days later, Mr. Lloyd George told the House of Commons that the policy was to come definitely to an end on September 1, explaining that it had been retained merely to shield industries during the period of demobilization, and that no further justification for it appeared to exist.[38]

When Parliament met again, the Coalition Government introduced an anti-dumping bill. It received little support and consequently, was not pushed. There was arising considerable opposition to the continuance of Government domination in business, which had come to obtain because of the War. This fact was one of the chief subjects of controversy during 1920. A return to free trade sentiment was occurring. It even appeared that the Government proposals for the protection of certain "key" industries would be rejected when introduced.[39] Such a complete reversal of sentiment, however, did not come about, as was evidenced by the acceptance of the Dye-stuffs Import Regulation Bill which was introduced in December.[40]

The passage of this act prepared the way and assured the introduction of the Safeguarding of Industries Bill. Compelled by the pressure of its Conservative participants, the Lloyd George Coalition finally offered two resolutions in the House of Commons to make good its election promises.[41] The first provided that a customs duty of 33.3 per cent *ad valorem* should be imposed upon nine classes of articles, whose manufacture was considered to be essential to success in war. These "key" articles included optical glass, laboratory porcelain, hosiery latch needles, metallic tungsten, and all synthetic organic chemicals. The second resolution provided that a similar duty should be imposed on articles offered for sale in the United Kingdom at prices below their cost of production, or at prices below those at which similar goods could be manufactured in the Empire, owing to a depreciation of currency in the country of origin. Manufacturers desiring protection under the second resolution were to apply to the Board of Trade, who would appoint a committee to survey the facts of their case, and report. The Board of Trade, upon a favorable report, could then issue an order authorizing the application of the duty, allowed under the second resolution, for three years. Such an action by the Board of Trade was subject to confirmation by Parliament. Duties for different reasons could be levied simultaneously, but the total could not exceed 66 per cent.

[36] Hirst, *op. cit.*, pp. 64–5.

[37] *Ibid.*, pp. 65–6.

[38] *Parliamentary Debates*, Commons, Vol. 119, 1919, Col. 2009–10.

[39] Hirst, *op. cit.*, p. 67.

[40] *Public Bills*, Vol. I, 1920, Bill 269. This bill made the importation of dye-stuffs illegal save under license.

[41] *Parliamentary Debates*, Commons, Vol. 142, 1921, Col. 867.

The Bill embodying these resolutions was not finally passed until August, 1921.[42] As Mr. André Siegfried has described it, it was "a regular Protectionist arsenal."[43] Its passage is extremely important, because it represents the climax reached by the protectionist movement arising directly out of the War. Furthermore, it was the last act to be justified by the Paris Resolutions.[44] To be sure, under Part I of the Bill, which went into force, October, 1921, duties were imposed for only five years; and under Part II, they could be levied for only three years. In addition, the minute precautions of the second half, made its application most difficult. A large number of articles were added, nevertheless, to the British tariff list by Part I. So many, in fact, that Mr. Hewins was led to assert: "After the passage of this Act, it was, of course, absurd to suggest that this country any longer retained the Free Trade system."[45]

The War left many marks upon British institutions; and not the least important of these was the change affected in the fiscal system. This change might have proved to be a temporary one, which would be eradicated in the course of time. Our next chapter, therefore, will treat of the movement up to the present time.

[42] *Public Bills*, Vol. I, 1921, Bill 183.

[43] Siegfried, A., *Post-War Britain*, (N. Y., Dutton, 1924), p. 25.

[44] *Parliamentary Debates*, Commons, 1921, Vol. 146, Col. 843–922.

[45] Hewins, *op. cit.*, p. 50.

CHAPTER III

RECENT MANIFESTATIONS OF PROTECTION, 1921 TO 1927

FOLLOWING the passage of the Safeguarding of Industries Act, the tariff schedule of Great Britain included, first, the old revenue duties which had long existed as part of the British fiscal system; second, the McKenna duties which had been applied continuously since their introduction in 1915; third, duties upon numerous articles which came under Schedule I of the new Safeguarding of Industries Act. Preferences of varying amounts were allowed upon these three groups of duties. Finally, there existed Schedule II of the new Act, the application of which we have not considered as yet. Admittedly, such a tariff schedule contained a more extensive commodity protection than a staunch Liberal free trader would have liked. Much of it represented a compromise between the two principal parties during the years of critical emergency; it was not the result of a deliberate program of the Conservative Party. Therefore, the years following the War might well have witnessed its obliteration. No such thing occurred, as we shall see in this chapter.

THE APPLICATION OF THE SAFEGUARDING OF INDUSTRIES ACT, SCHEDULE II

Shortly after the passage of this Act, several industries made application for inclusion under Schedule II which embodied the second resolution on safeguarding introduced by the Lloyd George Coalition Government. They alleged that German competition was made possible by that country's depreciated currency. The Board of Trade appointed committees to investigate, and their findings being in the affirmative an Order was issued subsequently by the Board granting

the industries protection. Among those allowed relief by this means were the manufacturers of fabric gloves, glove fabrics, domestic glassware, and domestic hollow-ware of aluminum or enameled iron or steel.[1] Another Order was issued shortly including gas mantles for the same reason.[2] No other inclusions were allowed, although a number of applications were received. This was due in part to the difficulties encountered by investigating committees in their efforts to determine whether goods were being sold below their cost of production in countries of origin, owing to the depreciation of their currencies.[3] It was also due to the official British interpretation of commercial treaties. Duties under this section of the Act could be allowed only against goods imported from Germany, because no commercial treaty was in existence with that country.[4] Again, because of these treaty complications preferences could not be granted under Schedule II.[5]

After a year's existence, the Safeguarding of Industries Act had fallen into serious disfavor. It did not seem to be accomplishing those things which had been promised for it. British trade and commerce, had sunk into severest depression. Apparently, the sentiment against protectionism had grown quite intense, for when Mr. Lloyd George's Government fell, Mr. Bonar Law pledged that, if he were returned to power, there would be no further change in the fiscal system of the country.[6] Security and confidence, which were so essential to Britain's recovery, he asserted, could be obtained best by refraining from any experiment; but he, of course, believed that she would profit by a change in the long run. He also pledged that fiscal policy was not an issue of the election, and that his party would take no steps in that direction without a mandate from the electorate. Such a pledge from a leading protectionist politician may be reasonably interpreted as reflecting a popular reaction against additional tariff reform.

[1] Order No. 1, *Board of Trade Journal*, Vol. 109, pp. 141–2.

[2] Order No. 2, *ibid.*, p. 418.

[3] Hewins, *op. cit.*, p. 49.

[4] *Ibid.*, p. 177.

[5] *Ibid.*, p. 50.

[6] Speech in South London, Nov. 7, 1922. See *The Times* (London), Nov. 8, 1922.

THE IMPERIAL ECONOMIC CONFERENCE OF 1923

Mr. Bonar Law had also announced his adherence to the policy of Imperial Conferences, during the campaign preceding his election. The last Conference had been held in 1921, but had not considered the usually commanding problem of protection and Imperial preference.[7] An Imperial Customs Conference had met at the same time but had dealt with only minor problems of technical uniformities.[8]

Upon his return to office, Mr. Law announced the meeting of another Conference to consider political problems of the Empire, and at the same time, an Imperial Economic Conference to treat economic problems. Because of his pledge upon protection, however, the probable success of any consideration of the preference question by the Conference was greatly jeopardized. As the situation stood, a Conservative Government, which had been tied to an Imperial policy since 1907, apparently did not intend to propose any measures of a fiscal nature to render that policy effective.[9]

Preparations for the two Conferences progressed, and a date was set for

[7] *Proceedings of the Imperial Conference*, 1921 (Cmd. 1474).

[8] *Proceedings of the Imperial Customs Conference*, 1921 (Cmd. 1231).

[9] Hewins, *op. cit.*, p. 57.

their meeting in October, 1923. The Empire Development Union, an official organization which had been formed to develop an Imperial economic policy, cabled the circumstances to the Governments of the various Dominions, and requested that they come to the Conferences prepared to consider and evolve only concrete schemes for Imperial expansion.[10] Preference proposals, among other topics which might be considered, were suggested by this communication.

Several months before the Conference was scheduled to meet, ill health forced Mr. Bonar Law to resign the premiership, and he was succeeded in office by Mr. Stanley Baldwin, who set out to follow his predecessor's policies. For a while, he appeared to be successful in his purpose, and no fiscal changes with regard to duties were suggested in the Finance Bill of 1923.[11] Even the McKenna duties were renewed again, so rigidly did the Conservatives follow Mr. Law's pledge, though Mr. McKenna in a letter to a musical instrument importer complained that the Government had betrayed his purpose in not removing them after the War.[12]

The Imperial Economic Conference met, as scheduled, on October 1st. In one of the opening addresses, Sir Phillip Lloyd-Greame, President of the Board of Trade, urged the need of accelerating the development of Imperial resources.[13] He asserted that, since Great Britain had definitely established the principle of Imperial Preference in her fiscal system, she now wished to apply the principle further within such limits as practicable to achieve the end desired. In the responding addresses of the Colonial Prime Ministers, many favorable comments were made on the efficacy of British preferences. For example, Mr. Mackensie King stated that Canada had been influenced to offer additional preferences by Britain's new attitude.[14] South Africa, according to General Smuts, was prepared to reshape her fiscal policy for greater common advantage.[15] The same sentiment was expressed by the representatives for both New Zealand and Australia.[16]

The British Government was prepared to meet this display of preference approval by some new proposals. Several days later, when the subject was set for discussion, Sir Lloyd-Greame asserted that, since the facts revealed the value of preference so clearly, his Government was now ready to make several offers of further grants.[17] He then proceeded to outline the additional reduction which the Government thought worth while on a group of articles imported from colonial sources; *i.e.*, certain dried fruits, currants, sugar, and tobacco, upon which duties were already in existence, other dried fruits and preserved fruits upon which duties would have to be imposed. The amount of preference on all the above articles save sugar and tobacco was named to be 100 per cent, while on these latter the offer was made of a ten-year guarantee for the maintenance of existing preference rates, with the possible alternative, in the case of tobacco, of an increase in the rate of preference.

The reaction of the colonial representatives is a story in itself. One by one, they arose and expressed their appreciation, and each in turn enumerated a list of additional products

[10] Quoted in full, *ibid.*, pp. 57–63. See especially pp. 62–3.

[11] See Mr. Baldwin's Budget Speech, *Parliamentary Debates*, Commons, Vol. 162, 1923, Col. 1737–40.

[12] Quoted by Mr. Hirst, *op. cit.*, p. 79.

[13] *Proceedings of the Imperial Economic Conference*, 1923 (Cmd. 2009), p. 31.

[14] *Ibid.*, pp. 36–7.

[15] *Ibid.*, pp. 47–8.

[16] *Ibid.*, p. 40 and pp. 57–83.

[17] *Ibid.*, pp. 175–8.

which his respective Government would be gratified to have granted preferential entrance into the markets of the United Kingdom.[18] Only the Indian delegate refused to commit his Government to preference, although he saw no reason for actively opposing it. It was a strange occasion, but the representatives of the Crown were equal to it. Their motives are not difficult to divine. For the moment, free trade traditions were discarded or forgotten; the ideals of an economically unified empire took their place. The Conservative Ministers, imbued with a ripe Imperial enthusiasm and stimulated by the all-pervasive nature of British trade depression, rose again boldly and raised their bid for Empire markets. Trade had been suffering the deadliest of ills. Pressure on business and commercial interests had never been so intense. Rumors full of the direst pessimism were current. In short, the time was propitious, the stage was set. There was every reason to believe that the electorate would approve this step in the hope of trade revival.

The Crown extended its offer by including an additional preference on tobacco; preferences upon raw apples, canned salmon, fruit juices; honey to the extent of 100 per cent; then an increase in the preference on wines and sparkling wines; and finally, a duty to be imposed upon barley and hops with a preference of one-third.[19] Even this Imperial gesture did not entirely satisfy the varied interests represented in the Conference, and each, amid profuse thanks, enumerated still other things upon which a preference would be desirable.[20] It appeared from this proceeding, that, now the British Government had crossed the Rubicon, there would be no end to the demands made upon it. In final approbation of the British preference proposals, the Conference unanimously reaffirmed the Preference Resolution of 1917.[21]

The above recital is not, however, the entire story of protection as dealt with by the Imperial Economic Conference of 1923. Many other proposals were made, including several untimely ones by Mr. S. M. Bruce, of Australia, for placing duties on, or granting other protection to principal food stuffs and raw materials with preferential arrangements for Empire products.[22] These proposals were, of course, rejected in toto by referring them to a committee which reported unfavorably. The remaining discussion given to protection was devoted to a consideration of confining government contracts to Empire products, with resolutions covering this point presented and passed.[23]

THE FALL OF THE CONSERVATIVES ON THE ISSUE OF PROTECTION

We have already suggested motives for the preference proposals of the Conservative leaders, and subsequent developments tend to verify them. Notwithstanding this, at the time, their proposals were the cause of much conjecture and criticism. Mr. Bruce added to the tenseness already existing in many quarters by publicly insisting that the United Kingdom would reap a profit from duties on foods and materials with preference grants on the same to the Empire.[24] Strong resolutions were passed by the protagonists of free trade in various organizations protesting against the Government's breach of faith.[25]

The Government was not slow in making clear its intentions; and on

[18] *Proceedings of the Imperial Economic Conference*, 1923 (Cmd. 2009), pp. 183–88.
[19] *Ibid.*, pp. 203–6.
[20] *Ibid.*, pp. 206–34.
[21] *Ibid.*, p. 238.
[22] *Ibid.*, pp. 57–83.
[23] *Ibid.*, pp. 253–4.
[24] See the *Nation* (London), Vol. 34, pp. 110–1.
[25] Hirst, *op. cit.*, p. 81.

October 25th, Mr. Baldwin, in an address to the annual Conservative caucus at Plymouth, announced that, while he regarded the unemployment problem as the most critical one facing the country, he could do nothing about it without a weapon of some sort.[26] After considering all the factors in the situation, he had concluded that "the only way of fighting this subject is by protecting the home market." The Government's position was made still more comprehensible by the following statement in the House of Commons during the debate on the Labor censure resolution. Mr. Baldwin said:[27]

"What the Government desires is release from the pledge given a year ago, to enable them to impose duties on manufactures generally for purposes of revenue and tariff negotiations, together with the full power to impose larger duties when the circumstances of particular industries require it. The Safeguarding of Industries Act is far too limited in its application to deal with goods from Germany which are today threatening our industry. . . . The Government has come to the conclusion that they cannot deal with this measure sporadically by an act of the nature of the Safeguarding of Industries Act, and that, if you want either to negotiate effectively, or if you want to give dominion preference, or if you want to raise revenue, you must make your duties general, even if they be but duties for revenue purposes."

The election which resulted from this issue was a bitter contest. No complete scheme for a general tariff was advanced in the campaign. A committee sat in secret, however, preparing a specific tariff plan, but no details were published.[28] The issue was the broad one of protection. Food duties, promised Mr. Baldwin, would never be imposed upon essential items. To tempt the farmers, he offered a subsidy paid out of the import duties on manufactures.[29] Whatever the leaders of tariff reform may have anticipated, the campaign, based upon the issues cited fell short in its appeal to the people. When the results were in, the Conservatives found themselves with a minority, and upon the refusal of the Liberals to support them, gave way to the formation of the Labor Government.

THE LABOR GOVERNMENT AND FREE TRADE

Mr. Phillip Snowden, who became Chancellor of the Exchecquer under Mr. Ramsay MacDonald, proceeded to interpret the defeat of the Conservatives as a clear mandate for the resumption of free import practices.[30] Accordingly, in his Budget, he eliminated the McKenna duties, and cut the existing tariff on sugar, tea, coffee and dried fruits. He made no effort to change prevailing preferences, but he denied the right of the former Government to pledge the maintenance of any preferences for specified periods, as had been done at the recent Imperial Economic Conference. As for the resolutions passed by that Conference, he would submit them to the House of Commons and abide by their decision. Finally, with regard to present Safeguarding of Industries duties, under Part II of that Act, he proposed to allow them to run their natural course, since they would terminate shortly.

The Budget was readily accepted by the House of Commons; but some difficulty was encountered in defeating the resolutions of the Imperial Eco-

[26] See speech quoted in *The Times* (London), Oct. 26, 1923.

[27] *Parliamentary Debates*, Commons, Vol. 168, 1923, Col. 485–6.

[28] The committee consisted of Viscount Milner, Professor Sir William Ashley, Professor Hewins and one or two business men. See Hirst, *op. cit.*, p. 84.

[29] *Ibid.*, p. 83.

[30] *Parliamentary Debates*, Commons, Vol. 172, 1924, Col. 1598–1604.

nomic Conference. After extended debate, however, the Government succeeded in getting them all rejected, even if by extremely close margins.[31] The ideal of a closely unified Empire was capable, apparently, of arousing strong sympathy and support, even in a situation hostile to a more inclusive protectionism.

THE RETURN OF THE CONSERVATIVES AND NEW PROPOSALS FOR SAFEGUARDING

The Labor Government was not destined to remain long in power, and in November of that year, a defeat at the polls forced its retirement from office. During the election, no issue was raised regarding fiscal policy, but when Parliament reconvened in December, the King announced in His address that: "A bill is under consideration and will be submitted . . . at an early date for safeguarding employment in efficient industries, where the need for exceptional action is established."[32] In defending this course, Premier Baldwin set forth a series of principles which were going to be fundamental in the Government's new safeguarding act.[33] First, any industry, to be safeguarded, must be one of substantial importance, and it must be efficient. Second, an industry to be safeguarded, must be subject to exceptional competition arising from such things as depreciated exchanges, bounties or subsidies, lower wages or longer hours in foreign countries and differences in tax burdens. Third, any duty must be a general and not a particular one, to avoid treaty complications. Fourth, a preference should be granted to the dominions.

No bill was forthcoming, however; the Government evidently had changed its tactics. Early in February, the Board of Trade issued in a "White Paper," the Government's new plan of safeguarding.[34] Under this arrangement, no bill was to be introduced. Instead, the Board of Trade would appoint investigating committees, and upon favorable report by them with the concurrence of the Board and the Treasury, the Government would include their recommendations in the Finance Bill. Duties would be imposed only for a limited period, the plan provided, but this period would vary with each case and would be prescribed by the Government in its finance proposals. The rules to be applied by the Board of Trade when applications are received, were modelled upon the principles set forth by Mr. Baldwin in the House of Commons:[35]

(1) The Board must be of the opinion that the industry applying for an inquiry in respect of the whole or any part of its production, can reasonably be regarded as of substantial importance on account either of the volume of employment engaged in such production, or of the nature of the goods produced.

(2) The Board must be of the opinion that there is *prima facie* evidence that the competition of foreign imports in the industry is exceptional, and that by reason of such competition, employment in the production of goods in question in the United Kingdom is being, or is likely to be, seriously affected.

(3) The applicant industry must show that in countries from which competition comes, the conditions in one or more respects set out in paragraph (5) of the Rules hereunder, for the guidance of committees, are so different from those in this country as to render the competition unfair.

(4) The Board of Trade will in their discretion, reserve the right to refuse an inquiry, irrespective of other conditions ob-

[31] *Parliamentary Debates, Commons*, Vol. 174, 1924, Col. 1863–2286.

[32] *Ibid.*, 1925, Vol. 179, Col. 49–50.

[33] *Ibid.*, Col. 1064.

[34] The substance of this "White Paper" is available in the *Board of Trade Journal*, Vol. CXIV, pp. 170–1, or see Board of Trade, *Safeguarding of Industry, Procedure and Enquiries*, 1924–5 (Cmd. 2327).

[35] *Ibid.*, p. 170.

taining in the industry, if they are of the opinion that the industry is not carried on in this country with reasonable efficiency and economy, or that the imposition of a duty on goods of this class or description in question would have a seriously adverse effect upon employment in any other industry, being an industry using goods of that class or description in production.

When the approval of the Board of Trade had been gained, the committee appointed to pursue further inquiry was instructed to report on the following questions:

(1) Whether the applicant industry is, by reason of the volume of employment, engaged in the production of the goods to which the application relates, or by reason of the nature of the goods produced, an industry of substantial importance.

(2) Whether foreign goods of the class or description to which the application relates, are being imported into and retained for consumption in the United Kingdom in abnormal quantities.

(3) Whether the foreign goods so imported are being sold or offered for sale in the United Kingdom at prices which are below the prices at which similar goods can be profitably manufactured in the United Kingdom.

(4) Whether by reason of the severity and extent of such competition, employment in the manufacture or production of such goods in the United Kingdom is being, or is likely to be, seriously affected.

(5) Whether such exceptional competition comes largely from countries where the conditions are so different from those in this country as to render competition unfair. Competition for the purpose of such inquiry is not to be deemed unfair unless it arises from one or more of the following causes:

(a) Depreciation of currency operating so as to create an export bounty.

(b) Subsidies, bounties, or other artificial advantages.

(c) Inferior conditions of employment of labor, whether as respects remuneration or hours of employment, or otherwise obtaining amongst these persons employed in the production of the goods in question, as compared with those obtaining amongst persons employed in the production of similar goods in the United Kingdom.

In making their report upon the alleged unfairness of competition, the committee may call attention to any special circumstances by reason of which, in their opinion, the industry of the United Kingdom is placed at a serious relative disadvantage.

(6) Whether the applicant industry is being carried on in the United Kingdom with reasonable efficiency and economy.

(7) Whether the imposition of a duty on goods of the class or description in question would exert a seriously adverse effect on employment in any other industry, being an industry using goods of that class or description in production.

(8) Whether, having regard to the above conditions, the applicant industry has, in the opinion of the committee, established a claim to a duty; and if so, what rate or rates of duty, in the opinion of the committee, would be reasonably sufficient to countervail the unfair competition.

The appearance of this "White Paper" aroused no little opposition. It justifiably gave rise to numerous accusations that the Government was letting general protection enter through the "back door." A resolution of censure was introduced by Labor on this very issue.[36] But in reply, Mr. Baldwin denied that any such intentions could be inferred from the Government's action; and asserted that they were only carrying on their announced safeguarding policy.[37]

THE CONSERVATIVE BUDGET OF 1925

This policy was merely an expansion of the provisions included under Schedule II of the 1921 Safeguarding of Industries Act. In applying that Act, two committees had been appointed, one to investigate the lace industry,

[36] See Censure Resolution and Speech by Mr. R. MacDonald, *Parliamentary Debates*, Commons, 1925, Vol. 180, Col. 703-20.

[37] *Ibid.*, Col. 720–6.

and the other the silk industry. The Government received their reports just prior to the ascendancy of Labor. The Lace Committee had reported unanimously in favor of a safeguarding duty, while the Silk Committee had been divided two against two.[38] No action had been taken, of course, on these reports during the year of Labor rule. Now the way was clear for the safeguarding of those industries. A new Lace Committee was shortly appointed and instructed to determine if the conditions reported by the 1923 committee still obtained.[39] When this committee found nothing had occurred to alter the original findings, the Government offered a resolution amending its finance proposals to allow for this duty.[40]

As for the silk report, no new investigation was authorized. When Mr. Winston Churchill, Chancellor of the Exchecquer, announced his Budget in the House of Commons, one of his most notable innovations was a sumptuary tax upon imports of silks and artificial silks, raw or manufactured.[41] This, however, was not the full extent of his protectionist proposals. He reëstablished the McKenna duties, claiming the same reasons for their reimposition as were advanced for their original passage in 1915. He further proposed a duty on hops which he frankly declared to be baldly protectionistic. Finally, he announced that the Government intended to carry out in the completest and most precise manner all pledges which had been made at the 1923 Imperial Economic Conference. All of these protectionist projects were incorporated into the Finance Bill of 1925 as it was ultimately passed.

THE NEW SAFEGUARDING OF INDUSTRIES POLICY IN PRACTICE

According to the original safeguarding proposals, any duties suggested, if approved by the Board of Trade and the Treasury, were to be included in the Finance Bill; and with the passage of that act, legislation was evidently to be closed until the next finance measures of the following year.[42] Applications, of course, could be received in the meantime and investigations could be made of the applicant industries. This is what actually took place in the latter half of 1925. A number of industries applied for safeguarding protection, including those concerned with the production of such commodities as superphosphates; brooms and brushes; leather and fabric gloves; cutlery; packing and wrapping paper; gas mantles; and aluminum hollow-ware.[43] Of this group, the applications of the superphosphate industry, the broom and brush industry, and the aluminum hollow-ware industry were rejected. The others were favored with varying rates of duties by their investigating committees. Leather and fabric gloves, for instance, were recommended to receive a 33⅓ per cent duty, as was also cutlery. Packing and wrapping paper, however, was only recommended to re-

[38] See Censure Resolution and Speech by Mr. R. MacDonald, *Parliamentary Debates*, Commons, Vol. 172, 1924, Col. 213.

[39] Board of Trade (Safeguarding of Industries), *Report of Lace and Embroidery Committees*, 1925 (Cmd. 2403).

[40] *Ibid.*, Vol. 184, 1925, Col. 2271–2336.

[41] See Budget Speech, *Ibid.*, Vol. 183, 1925, Col. 66–70.

[42] Board of Trade, *Safeguarding of Industries, Procedure and Enquiries, op. cit.*

[43] See the following reports of the Board of Trade on Safeguarding of Industries; *Report of Superphosphates Committee*, 1925 (Cmd. 2475); *Report of Committee on Brooms and Brushes*, 1925 (Cmd. 2549); *Report of Committee on Leather and Fabric Gloves and Glove Fabrics*, 1925 (Cmd. 2531); *Report of Committee on Cutlery*, 1925 (Cmd. 2540); *Report of Committee on Packing and Wrapping Paper*, 1925 (Cmd. 2539); *Report of Committee on Gas Mantles*, 1925 (Cmd. 2533); *Report of Committee on Aluminum Hollow-ware*, 1925 (Cmd. 2530).

ceive a duty of about half that amount, 17½ per cent, to be precise, while gas mantles were recommended to receive a flat duty of six shillings per gross.

Following these recommendations, the Government determined to take steps for their immediate application. Hence, instead of awaiting the introduction of the Budget to make provision for them, resolutions were promptly moved in the House of Commons (December 2 and 3, 1925) making the duties upon cutlery, gloves and gas mantles effective at once.[44] The resolutions were readily passed with large majorities, though not without strenuous debate upon the general question of protection, and upon whether or not the Conservatives were breaking their election pledge. Gradually, it was claimed by the opposition in this debate, the Government was involving the country in a widespread program of protective tariffs. Where, they asked, was the Government going to draw the line in its safeguarding policy, demarcating it from a policy involving a general protective tariff?

The answer was not long in coming from the Government. A few days after the House of Commons had passed the third reading of these resolutions, Mr. Baldwin announced that an application for safeguarding protection had been refused the iron and steel industries.[45] The reason was, he said, that the repercussion of such protection would have been so far-reaching as to practically set up a general protective tariff in violation of his election pledge. The situation was so serious, however, according to his statement, that, had they been able to consider the iron and steel trades in isolation, the case would have been considered complete.

[44] *Parliamentary Debates*, Commons, 1925, Vol. 188, Col. 2273–2474 and 2567–2698.

[45] *Ibid.*, Vol. 189, Col. 1945.

THE BUDGET OF 1926

The Government, however, did not intend this to denote a relinquishing of its safeguarding policy, nor to suggest that it had any intention of modifying its policy. Later developments clearly evidence that the Ministry was fully determined to continue its pursuit. A committee, appointed to investigate the wisdom of maintaining Schedule I of the Safeguarding of Industries Act of 1921 (relating to the so-called "key" industries), reported favorably.[46] In fact, they recommended its reëstablishment for a period of from five to ten years; its extension to a few additional articles; the increase of the duty rate in the case of optical glass and instruments; and exemption from duty by special Board of Trade order after application and investigation.

At the same time, two safeguarding reports failing to recommend duties were made public, one on worsteds and woolens, and one on enameled hollowware.[47] The first one was by far the more significant, for such a grant would have extended safeguarding to one of the important staple industries. Only one requisite was found lacking; *i.e.*, unemployment. The report acknowledged, however, that sentiment was not unanimously in favor of a duty throughout the industry, the woolens group being strenuously opposed. Nevertheless, the committee was so sympathetic to the pleas of those who desired protection that it did recommend a small tariff of 12½ per cent in case future conditions should change so as to make it expedient.

Mr. Churchill's Budget Speech of 1926 followed in the train of this protectionist movement.[48] He proposed

[46] *Board of Trade Journal*, Vol. 116, pp. 476–7.

[47] *Ibid.*, pp. 477–8.

[48] *Parliamentary Debates*, Commons, 1926, Vol. 194, Col. 1687–1709.

to meet the recommendations of the committee which had considered Schedule I of the Safeguarding Act by reenacting its provisions for ten years, raising at the same time, the duties on optical glass and instruments to 50 per cent. In addition, he accepted the request to safeguard wrapping paper by imposing a duty of 16⅔ per cent; reimposed the silk duties, and extended the McKenna duties on motor vehicles from passenger to commercial cars.

Finally, he requested Parliament to pledge the maintenance of existing preferences for ten years, thus making, as he argued, for stability. The Finance Bill as passed included these provisions. Plainly, the Conservative Government did not intend to relinquish its tariff program yet. Every opportunity to advance its cause was being utilized. Safeguarding was the chosen means, selected by that Government to secure its ends, and, at the same time, avoid the broad issue of general protection.

THE IMPERIAL CONFERENCE OF 1926

The meeting of the 1926 Imperial Conference is another event of significance in our record of Britain's protectionist trend. With the story of the last Conference freshly in mind, we approach this one for more evidence of the unremitting pressure which had been forthcoming from this source for closer commercial relations through preference. On the whole, we find this Conference less concerned with the problem than any of the previous ones. Apparently, it deliberately avoided the preference question, content with the approval by the Crown of present fiscal policies. On the other hand, absorbing political questions which demanded the attention of the session may have obscured it as an issue. The Empire was foundering upon the rocks of dominion nationalism. New constitutional definitions of status, therefore, engrossed the main consideration of the Conference.[49]

Due respects were paid, nevertheless, to the importance of preference as a stimulator of Empire trade. Mr. Baldwin, in his address at the opening of the Conference, expressed his confidence that preferences had increased the flow of inter-Imperial commerce.[50] In the series of responses delivered by the visiting dominion ministers, assertions were strongly in favor of it, and many pleas were made for its extension.[51] The members were taking this opportunity to press home their appreciation of an advantage gained in British markets by this policy. Mr. Bruce of Australia, in particular, whom we recall as so ardent a proponent of preference at the preceding Conference, sang its praises with extreme enthusiasm, pointing out the increase in trade between Australia and the rest of the Empire since its adoption. He again urged duties and preference by the United Kingdom on those foods and raw materials which could be so abundantly produced in the Empire. In this sentiment he was supported by other members.

Other economic problems were not without consideration. There had been at work since the preceding Conference several permanent Imperial organizations; for example, the Imperial Shipping Committee, the Imperial Economic Committee, the Imperial Institute, later amalgamated with the Imperial Mineral Resources Bureau, the Imperial Forestry Institute, and the newly established Empire Marketing Board. The efforts of these or-

[49] See the *Report* of the Committee on Inter-Imperial Relations in *The Times* (London), Nov. 22, 1926.

[50] See the opening address of Mr. Baldwin, *ibid.*, Oct. 20, 1926.

[51] *Ibid.*, Oct. 25, 1926.

ganizations and the reports compiled by them advantageously supplanted the more formal resolutions of the Imperial Conferences, in bringing about closer commercial relations between the Empire's constituent states. As an illustration, the Merchandise Marks Bill, intended as a subtle preference scheme, had been designed by the Imperial Economic Committee, and was wending its way through Parliament at this very time.[52]

Institutions and organizations of this kind making for closer Imperial relations were being established, reënforcing with definite proposals and research into facts, the formal declarations of the Conferences. They may be looked at from two points of view; first, as a means of temporarily avoiding further insistence on preference by the dominions; second, as sincere and genuine steps in coöperation which might lead to greater stimulation of the Imperial movement, and consequently, of Imperial preference. The possibilities of the latter being the case loom large in the light of the movement as we have traced it in our study. That preference failed to occupy its usual place in the center of the stage at the Conference can hardly be regarded as evidence of weakening importance.[53]

Its absence, moreover, may be explained from another point of view. Simultaneously with the opening of the Imperial Conference of 1926, there was published a plea for international economic freedom signed by a conspicuous group of bankers and business men of the United Kingdom and other European countries, with one or two signers from the United States.[54] The manifesto urged that sight had been lost of the common economic interests of the world. Further world recovery was being materially delayed by the existence of trade barriers. Whatever its purposes, or however opportune its publication may have been, probably the nature of this manifesto had a salutary effect upon the existing spirit of protectionism. Moreover, it must have had its echoes in the Conference chambers. Indirectly, and in spite of a Government of professed protectionist sympathies, the supporters of free trade raised their voices in a timely statement subtly reminding the colonial delegates of Great Britain's peculiar position with regard to Continental and world trade. The forces of free trade were not impotent, and their strategy may have forestalled further steps toward preferential protection at this 1926 Conference. Had there been such steps, an election upon the issue might have been precipitated.

PROTECTION IN 1927 AND SOME FURTHER COMMENTS

While several safeguarding investigations have been conducted since the passage of the 1926 Finance Bill, *e.g.*, into industries manufacturing hosiery and knitware, tableware of translucent and vitrified pottery, and leather bags and metal fittings, only one of these succeeded in securing a safeguarding duty. In Mr. Churchill's 1927 Budget Speech, provision was made for a 28 per cent duty upon translucent and vitrified pottery with an Empire preference of one-third.[55] Mr. Churchill's protectionist innovations were not confined to one, however. He also ex-

[52] Imperial Economic Committee, *First Report;* "Marketing and Preparing for Markets of Foodstuffs in the Overseas Parts of the Empire," 1925 (Cmd. 2493), pp. 6–7.

[53] For example, the General Economic Sub-Committee on Empire Films recommended ample preference upon cinema films produced in the Empire, *The Times* (London), Nov. 20, 1926.

[54] *Ibid.*, Oct., 25, 1926.

[55] See Budget Speech quoted in *The Times* (London), April 12, 1927, pp. 8–9. Also a summary of Budget provisions in the *Board of Trade Journal*, Vol. CXVIII, p. 414.

tended the McKenna duties to tires, which action, he declared, would give the Liberal Party an excuse for continued existence. In addition, he made provision for the inclusion of non-standard cinema films in the McKenna film duty. For revenue purposes, he increased the duties on matches, unmanufactured tobacco, and wines, making in this latter case, provision for Empire preference both in the actual amount of the duty and in the amount of alcoholic content.

One wonders where this method of protection by safeguarding may ultimately lead. So far as the extent of its application goes, the number of workers employed in industries granted safeguarding duties upon Board of Trade recommendations is roughly, as judged by the reports of the investigating committees, about 83,500, not a large number relative to the total number of British workers. A much larger number, roughly 425,000, are employed in industries protected by McKenna duties.[56] Consistent progress on safeguarding may enlarge this number considerably. If the industries protected under Schedule I as "key" industries, are considered, the number of workers in protected industry is further increased by several thousand.[57]

Opposition of a very keen sort naturally has arisen against the extension of protection. Nevertheless, the Conservative Party has had an adequate majority to carry through its policy of safeguarding. Moreover, they have passed the Merchandise Marks Bill, which, upon complaint to the Board of Trade and an affirmative order from it, requires competing goods to be marked as to the country of origin.

In all of these steps, the Government has moved with caution. Yet political antagonists have accused them many times of breaking their pledge to the people. Also, industries affected adversely by the safeguarding policy because the protected industry stands in such a relation to them that their own pecuniary interests have been involved, have been active opponents before the Board of Trade and its investigating committees. As a matter of fact, it is difficult to see from the reports of such committees that adequate scientific evidence has been compiled to establish protection.[58] When we recall the terms of the Government's instructions to them, however, it is conceivable that they have acted fairly in their recommendations.

So much for the course of protection up to the time of writing. We suggested in the concluding paragraph of the previous chapter that the movement might prove to be a temporary one, yielding gradually with the return of peace time conditions. That such a

[56] A statement of the number employed in these industries by the Board of Trade, exclusive of tires, as of July, 1925, occurs in the *Parliamentary Debates*, Commons, Vol. 198, Col. 3017.

[57] Probably to a figure of not more than 600,000. This rough estimate is based upon the figures referred to in the foregoing note, and upon a review of the statistics on the number of people engaged in various industries, as of June, 1921. See Committee on Industry and Trade, *Survey of Industrial Relations*, 1926, pp. 403–15.

[58] Prof. T E. Gregory writes that in no instance has a case for protection been proven. Wrapping paper, he points out, was granted protection on a 5 per cent increase of imports over 1913, which increase is accounted for by the increase in the use of kraft paper, a special paper made abroad and only slightly manufactured in the United Kingdom. Furthermore, this duty was urged by the committee as an experiment. Another industry, making gas mantles, was given protection merely on the plea of national importance. Low wages or unfair competition have been asserted without substantiation of reasonable data. We concur with Professor Gregory, after examining the available published reports, that it appears largely chance whether an industry gets protection or not. See his article, "Tariff Disorders on Their Merits," *Manchester Guardian Commercial, Annual Review of 1925*, p. 29.

readoption of a free trade system has not taken place the events narrated in this chapter abundantly disclose. Speculation about the future possibilities of protection in Great Britain, consequently, would not be without justification at this point. Let us refrain from it, however, until we have examined the fundamental economic forces at work throughout the whole period. To this task the next two chapters are devoted.

CHAPTER IV

GREAT BRITAIN'S PRE-WAR ECONOMIC STATUS AND THE MOVEMENT TOWARD TARIFF PROTECTION

HAVING traced the outward manifestations of the movement for tariff reform up to the present time, we must turn now, as just suggested, to a review of industrial and trade developments in order to gain a complete picture. It will be recalled that we noted the rapid expansion of British trade from 1850 on, and the subsequent slowing up after 1868, which date marks the beginning of a series of movements for tariff reconstruction. A large number of forces, beyond a doubt, were highly influential in shaping the origin and evolution of such movements. Of these forces, none were more important than pecuniary considerations. That is to say, the economic actions of individuals, and hence, of groups, are determined in large measure by their immediate interest in connection with particular bargains. Trade conditions tend to be the barometer of the economic interests of the majority. They are, therefore, especially revealing for our analysis.

EXPORT TRADE BEFORE 1900

While it is not our intention to write a complete analysis of British trade from 1850 to the present time, it does seem desirable for the reader to possess some concept of what changes had taken place during the fifty years prior to the period which it is our intention to describe more carefully. In order to obtain a graphic perspective, Chart 1 has been prepared with the data carried through from 1850 to 1902.[1] In the latter year began the great political struggle for the modification of the free import policy, under the leadership of Mr. Joseph Chamberlain. Export data have been used because they are regarded generally as reliably representing British economic conditions, that country being so predominantly a trading nation. Because of the striking price changes which took place during this period, it has been found desirable, in order to eliminate this disturbing element, to divide the raw figures for each year with the corresponding Sauerbeck Index Number of wholesale prices, the base being an average of prices from 1867 to 1877.[2]

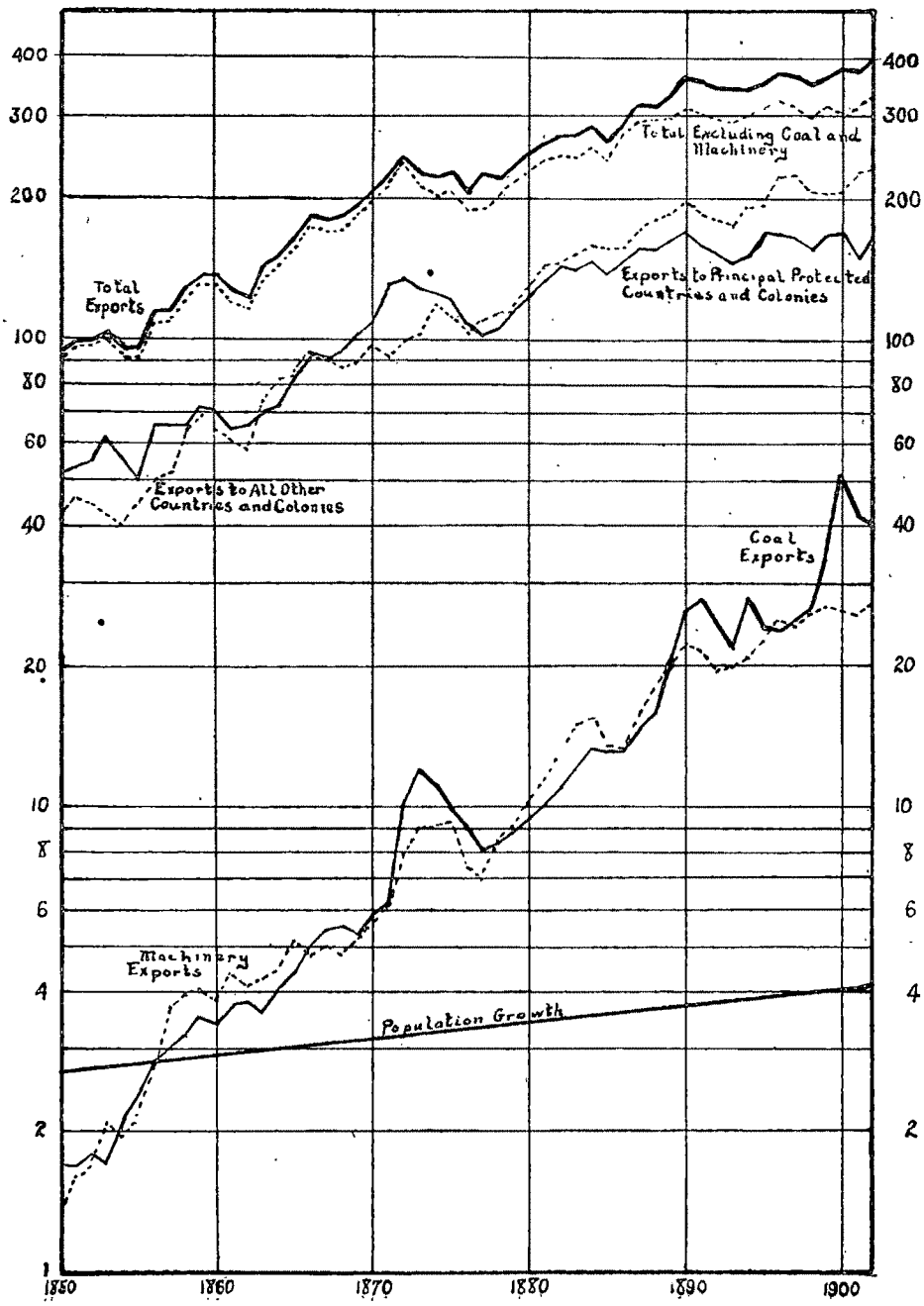
We have given on this chart, six lines in addition to a line drawn to indicate the growth of population. Since the scale upon which the chart is drawn is a ratio scale, the long time movements of these curves may be compared accurately with one another. Two of them, the curves of *coal* and *machinery*

[1] Board of Trade, *British and Foreign Trade and Industrial Conditions*, 1903 (Cd. 1761), pp. 18–9 and 97.

[2] Bulletin of the U. S. Bur. of Lab. Sta., *Index Numbers of Wholesale Prices in U. S. and Foreign Countries*, 1921 (284), pp. 275–81. Prices adjusted by the present writer.

CHART 1—INDICATING THE TREND OF BRITISH COAL, MACHINERY AND TOTAL EXPORTS TO ALL DESTINATIONS; AND OF TOTAL BRITISH EXPORTS TO THE PRINCIPAL PROTECTED COUNTRIES AND COLONIES AND TO ALL OTHER DESTINATIONS, IN EACH YEAR, 1850–1902

(Adjusted values used. Logarithmic vertical scale.
Unit: £1,000,000)



exports, included here because of their growing importance as exports in this period, show a fairly steep and constant rate of growth for the entire period; that is, their secular trends could best be described by a straight line. For the curves, *all other products* and *total exports*, the trends could best be described by rising lines with a diminishing rate of ascent. Thus, they show for the whole period an increase, but the rate of growth is seen to be decreasing, indicating that the expansion of British trade was meeting with increasing resistance. The rate of growth, however, is still observed to be in advance of population. The rapid rate of growth in *coal* and *machinery exports* was at times the basis of economic pleas for tariff reform. A continuation in the growth in the latter classes of exports, it was urged, indicated an early exhaustion of Britain's basic resources, as well as increasing foreign industrialization; while a decrease in the former revealed that she was hardly maintaining her position in world trade.[3] Dire prophecies, consequently, were made concerning the future of British trade.

The trends of the other two curves, which show the data of *total* exports of British produce to the *principal protected countries and colonies*,[4] and to *all other countries and colonies*, were likewise the cause of some concern to observers.[5] It is evident from the curves that a very pronounced change in the direction of the export trend to the *principal protected countries and colonies* took place after 1872.[6] That is to say, although trade with these countries from that year on continued to increase, the fluctuations were violent, and the rate of long-time growth was greatly decreased, tending to become less than that of population. Export trade to *all other countries and colonies*, on the other hand, increased at a much greater rate, though even here it tended to diminish. This shift, perhaps, may be further illuminated by the use of percentage figures.[7] In 1850, 56 per cent of the exports of all articles of British produce were shipped to those countries designated as *principal protected countries and colonies* and in 1870, 53 per cent, while in 1902, only 42 per cent. Correspondingly, the exports to *all other countries and colonies* increased from 44 per cent in 1850 to 47 per cent in 1870 and 58 per cent in 1902. When only exports of manufactured produce are considered, the former figure fell from 57 per cent in 1850, to 38 per cent in 1902, while the latter rose from 43 per cent in 1850 to 62 per cent in 1902. In addition, the proportion of manufactured exports to total exports was falling in this same period from 96 per cent in 1850 to 75 per cent in 1902 for the *principal protected countries and colonies*, and from 91 per cent in 1850 to 87 per cent in 1902 for *all other countries and colonies*.

IMPORTS BEFORE 1900

Further information concerning the shifts which had occurred in trade may be gleaned by considering net imports.[8] On the whole, they grew almost con-

[3] Ashley, *op. cit.*, pp. 259–63.

[4] The *principal protected countries and colonies* include Russia, Germany, France, Belgium, Holland, Spain, Portugal, Italy, Austria-Hungary, United States, Canada and Victoria. Belgium and Holland are included because a large part of their imports pass on into Germany. See Board of Trade, *Report on British and Foreign Trade and Industrial Conditions*, 1903 (Cd. 1761), p. 13.

[5] Cunningham, W., *The Rise and Decline of the Free Trade Movement* (Univ. Press, Cambridge, 2nd ed.) pp. 107–8.

[6] In interpreting these curves, the reader is cautioned to keep in mind that boundary changes, especially from the expansion of the British Empire, have had an important influence on the figures.

[7] Board of Trade, *British and Foreign Trade and Industrial Conditions, op. cit.*, pp. 16–7.

[8] *Ibid.*, pp. 99–104 and 403–4.

stantly during the period. On the other hand, imports for reëxport purposes indicated a much lower rate of growth for the twenty-five years prior to 1890 and practically no growth after that date.[9] Apparently, since exports tended to increase at a diminishing rate, a great increase in the invisible items entering into trade was occurring in these latter years to enable payment for the large imports. In other words, although Great Britain was still predominantly industrial, her imports were being paid for more and more by means of the income from financial, commercial and shipping transactions of all sorts. Moreover, the continual growth of imports was being constituted each year of a larger proportion of manufactured goods, amounting, for example, to 11 per cent of the net imports in 1860 and 25 per cent in 1902. That is to say, other countries were offering more and more of their manufactures in exchange for British manufactures and services; whereas formerly they had offered mainly foods and raw materials.

This change could work no ill effects upon British trade in itself, providing sufficient foods and raw materials were imported from the same or alternative sources, the manufactured goods being in excess of the essentials for sustaining a growing industry. But when we consider more closely the possible nature of the increased importations of manufactured goods, an element of friction appears. In many cases, they probably consisted of desirable goods not generally produced in Great Britain, or at least, more cheaply abroad. In some cases, the importations were doubtless variations and refinements in the quality of common products, not duplicated by British manufacturers. When such conditions obtained, there was a sound basis for the existing system of trade. There may have been in many instances, however, and probably were, manufactured goods imported of an actively competitive nature. When this occurred, and where such competition was felt, the friction which the British economic machine ordinarily encountered without necessity of adjustment was manifoldly increased. In such fields, the soil was fertile for the germination of the seeds of protection such as bloomed in the Chamberlain campaign.

[9] Falling from 12 per cent of total imports in 1854 to 10.6 per cent in 1902.

BRITISH FOREIGN TRADE FROM 1900 TO 1914

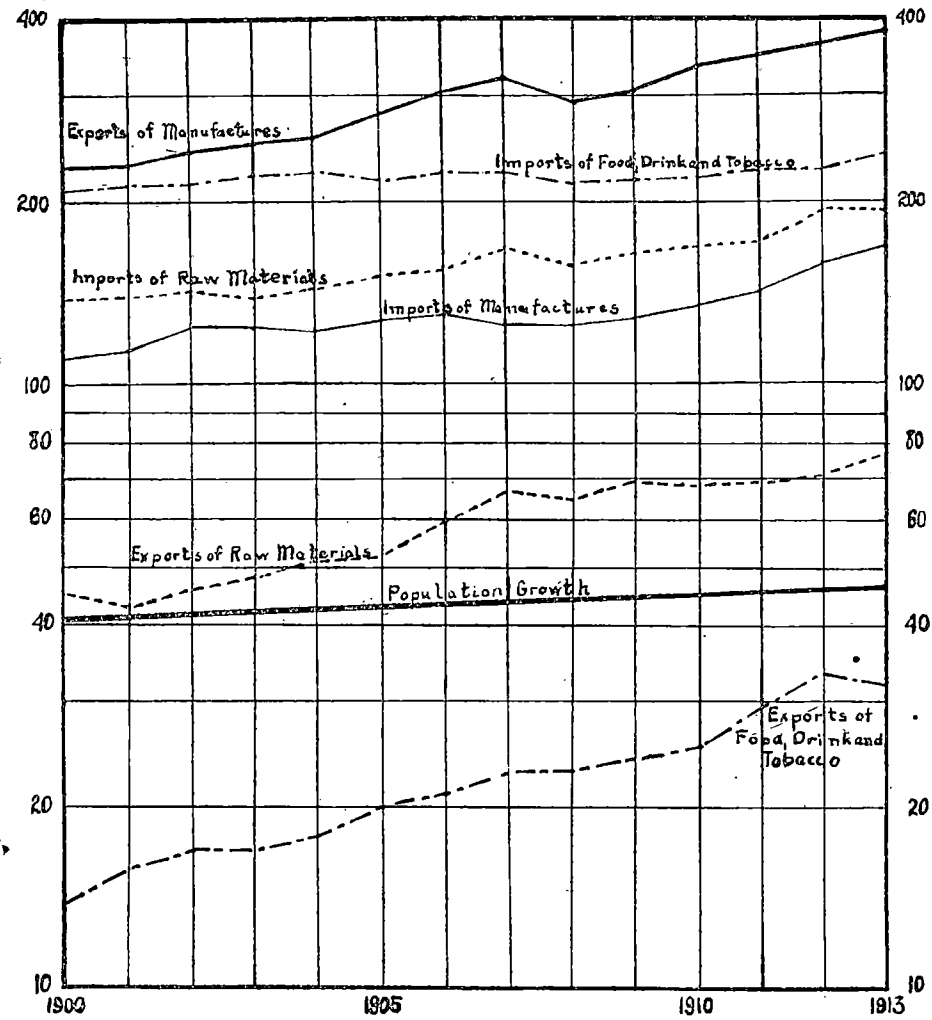
Subsequent developments in British foreign trade throw additional light on an understanding of the tariff reform movement during the immediate pre-war period. The general character of that trade may be seen in Chart 2, which shows the annual net imports and total exports of United Kingdom produce, divided into classes, adjusted values being used with 1900 as a base.[10] For example, the trend of imports of the *food, drink and tobacco* curve, it is seen, accords closely with the line of population growth. Exports of this class, however, increased faster than did population, and may be accounted for by the increased exportation of manufactured foods, excluded from classification as manufactured goods because of food qualities. Relative to the total this class is small.

Again, imports of *raw materials and articles mainly unmanufactured* show a greater rate of increment than population, indicating industrial gains. Exports of this class, on the other hand, consisting largely of coal, show a diminishing rate of growth after 1909, but this diminution did not fall below that of population for the remaining period.

[10] Adjusted by the Board of Trade. See its memorandum, *Imports and Exports at Prices of 1900*, 1914 (Cd. 7432), pp. 30–1.

CHART 2—SHOWING THE NET IMPORTS AND TOTAL EXPORTS OF BRITISH PRODUCE, DIVIDED INTO CLASSES, IN EACH YEAR, 1900–13

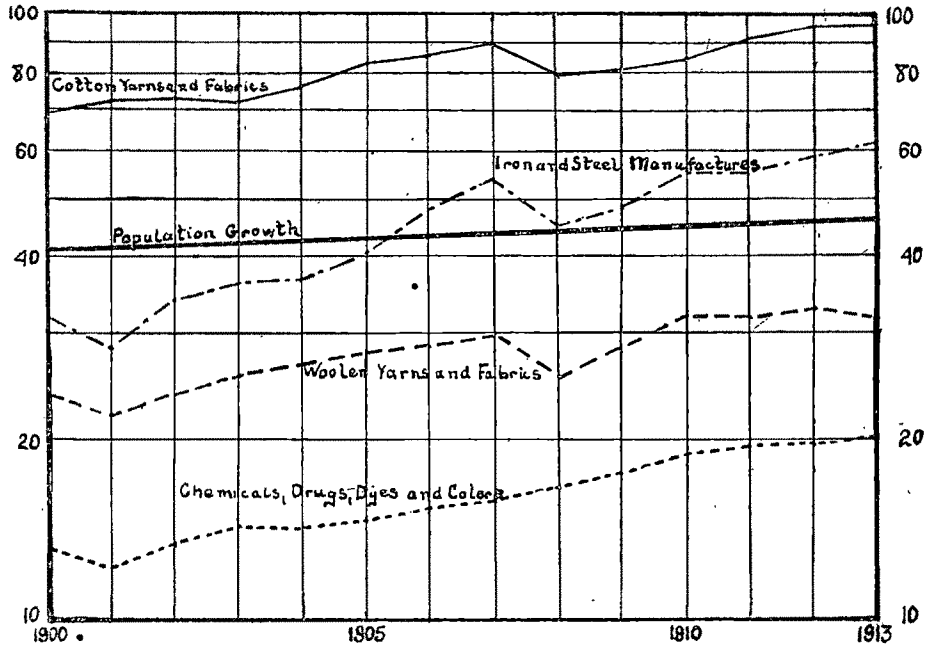
(Adjusted values used. Logarithmic vertical scale.
Unit: £1,000,000)



The curves of exports and imports for the third class of goods, *i.e.*, *articles wholly or mainly manufactured*, are especially interesting, for over one-fourth of the total value of the 1913 imports, and over three-fourths of the total value of the 1913 exports were included in this class. The course of the imports reveals a consistent upward swing for the entire period, with deflections occurring in the years 1907, 1908 and 1909. The rate of growth is much greater than the rate of population growth. The exports curve (for this class), while fluctuating considerably from year to year, also reveals a steady upward trend, apparently, at a greater rate of increase than is indicated by the imports curve. Since the exports of this class of goods are made largely of

CHART 3—SHOWING BRITISH EXPORTS OF (1) IRON AND STEEL MANUFACTURES; (2) COTTON YARNS AND FABRICS; (3) WOOLEN YARNS AND FABRICS; AND (4) CHEMICALS, DRUGS, DYES AND COLORS, IN EACH YEAR, 1900–13

(Adjusted values used. Logarithmic vertical scale. Unit: £1,000,000)



the products of the great staple industries, these figures would seem to show a rather healthy state of affairs in the major portion of industry. A rejuvenation had plainly taken place in British foreign trade.

EXPORTS OF FOUR STAPLE MANUFACTURES

An additional chart, Chart 3, enables the pursuit of further analysis into the condition of exports of four of the great staple industries.[11] The four principal groups of articles (*mainly or wholly manufactured*) representative of these staple industries are: (1) *iron and steel;*[12] (2) *cotton yarns and fabrics;* (3) *woolen yarns and fabrics;* (4) *chemicals, drugs, dyes and colors.* The trend for the first two named increased regularly for the whole period, and were both greater than population growth. Prior to 1907, however, the rates of growth for both classes of staple exports were higher than in the later years; and in the former years the rate of growth was greater for *iron and steel* than for *cotton yarns and fabrics,* while in the later years, the growths were approximately the same. Of the other two curves, the one representing exports of *chemicals, drugs, dyes and colors,* increases consistently for the entire number of years.[13] This is especially interesting

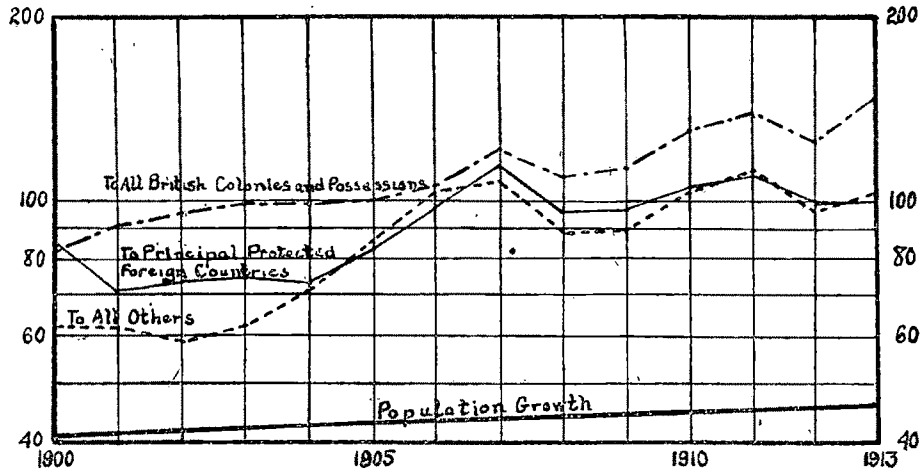
[11] Board of trade, *Imports and Exports at Prides of 1900, op. cit.,* pp. 36–7. These values likewise have been adjusted for prices by the Board of Trade.

[12] Producers in the iron and steel and woolen industries, it will be recalled, were in favor of protection in the war period. See above, pp. 205–206.

[13] According to British official opinion, the progress of the chemical industries in the pre-war period was very limited. See quotation, *infra,* pp. 73–74.

CHART 4—SHOWING THE DISTRIBUTION OF BRITISH MANUFACTURED EXPORTS BETWEEN THE PRINCIPAL PROTECTED FOREIGN COUNTRIES; ALL DOMINIONS; COLONIES AND POSSESSIONS; AND ALL OTHER DESTINATIONS, IN EACH YEAR, 1900–13

(Adjusted values used. Logarithmic vertical scale.
Unit: £1,000,000)



when we recall that it was in this period that the German chemical industry was developing into the greatest in the world. The curve representing exports of *woolen yarns and fabrics* reveals the least healthy condition. While the rate of accession, for example, prior to 1907, is greater than that for population, after the depression of 1907 and the recovery of 1908 and 1909, the curve levels off, and shows neither a marked decline nor incline for the remaining four years. Apparently, this industry was having difficulties in maintaining its export position.[14]

[14] It is to be noted that the present writer has made no effort to make a comparative study of the exports of Great Britain's staple industries and those of other great industrial nations, and to prove thus the comparative decline of Great Britain, as is often done; *i.e.*, Drage, *op. cit.*, Chapter 4, and Hewins, *op. cit.*, Chapters 8 and 9. The writer is not convinced that such discussion is at all fruitful, or that such comparisons prove anything in particular, save that an industrial civilization may be acquired by almost any nation possessing the energy, intelligence and natural resources.

THE DISTRIBUTION OF BRITISH EXPORT TRADE

In order to appreciate the shifts that were taking place among markets for British goods, especially *protected and other markets*, we have prepared Chart 4, which, as distinguishable from the similar curves on Chart 1, gives only data for manufactured exports.[15] This enables a more accurate picture, perhaps, since these are the classes of goods against which tariff barriers are erected. Differing from the previous curves again, this group is divided between three, instead of two destinations, *e.g.*,

[15] Board of Trade, *Return Showing the Value of Manufactured and Partly Manufactured Articles (Domestic Produce) Exported from the United Kingdom,* (a) *to the Principal Protected Foreign Countries;* (b) *to all British Colonies and Possessions;* (c) *to All Other Destinations for the years 1800, 1885, 1890, 1895, 1900 and for each subsequent year to 1911,* etc., 1912–13 (536); p. 3. Also, *Annual Statement of Trade of the United Kingdom with Foreign Countries and British Possessions,* 1913, Vol. II, 1914 (Cd. 7585), pp. 20–5.

(1) *the principal protected foreign markets;* (2) *all British colonies, dominions, and possessions;* (3) *all other destinations.* The values used have been adjusted on 1900 as the base year by the Board of Trade.

It is to be noted from the chart that it is impossible to describe the curve of this class of exports to the *principal foreign protected markets* by any particular sort of upward trend prior to 1904. British trade to these markets was evidently barely holding its own, and registering no increase. Expressed in per capita terms, in other words, this trade was declining. From 1904 to 1907 it recovered and even showed a remarkable vitality, slumping again in 1908 and 1912. Unquestionably, the exports of British manufactured goods continued to be severely handicapped by tariff barriers, as well as by the competing industrial technique which was developing behind them, other circumstances being propitious.

This does not mean that tariff barriers were the sole obstacle to a larger expansion of British export trade in this period. The curve of exports to *all other destinations* indicates that this was not the case. For example, after 1904 this curve fluctuates around the curve of exports to the *principal protected foreign countries.* The extension of competition is suggested by this as becoming a factor of growing importance. For the entire period there is an upward trend observable at a somewhat greater rate than that of population growth. Severe fluctuations tend to conceal it. These markets were patently very erratic absorbers of British manufactured goods.

Turning to the third curve, that of exports to *British dominions, colonies and possessions,* we see the most consistent trend of all. It will be recalled that the self-governing dominions were engaged in altering their tariff systems during this period. In some cases increasing barriers were erected, but, at the same time, preferences were being granted and extended to British manufacturers. Whatever the effects these changes may have had, we may believe, at least, that trade with *the colonies and possessions* in this period was characterized by a long-time consistency which other trade lacked.

Too much stress must not be placed upon this fact, however, lest we be drawn into the error of concluding hastily as to the growing importance of Empire trade in relation to the whole of British exports of manufactures. Nevertheless, in terms of percentages of total manufactured exports, Empire exports which grew from 35.8 per cent in 1900 to 41.8 per cent in 1903, fell off to 35.2 per cent in 1906, from which percentage they gradually rose until in 1913 they amounted to 42.2 per cent of the total.[16] Those to *all other destinations* acted in an opposite fashion, being 27.3 per cent in 1900, reaching 33.2 per cent in 1906 and subsequently declining to 29.5 per cent in 1913. Manufactured exports to *principal protected foreign countries,* furthermore, falling sharply from 36.9 per cent in 1900 to 31.7 per cent in 1901, tended to retain a fair stability around this figure until 1910, when they again fell off, reaching 28.3 per cent in 1913. Thus, while the percentage changes were not extremely marked, with allowances for the year to year shifts, it does appear reasonable to conclude that they thoroughly substantiate our previous conclusions. Empire trade throughout the period was slightly the largest proportion of the total trade as against trade with the principal protected markets and trade with all other markets. Finally, in terms of annual averages, the Empire

[16] These figures have been compiled from the data contained in the Board of Trade *Return, Ibid.*

trade of these fourteen years was much higher than that of the ten years previous, the average annual percentage of manufactured Empire exports to total exports for that decade being 33.6 per cent, while the average annual percentage from 1900 to 1913 was 38.8 per cent.

UNITED KINGDOM IMPORTS FROM EMPIRE SOURCES

Because of the understanding such analysis as the foregoing adds to the full comprehension of the momentum gained by the preference movement in the pre-war era, it seems desirable to pursue it even further. For example, the question arises at this juncture whether or not Great Britain was becoming increasingly dependent upon the colonies and possessions for her food and raw materials. An answer to this may be found by analyzing net imports from Empire sources as percentages of total net imports.[17]

Total net imports of all Empire produce increased from 21 per cent in 1900 to 25.2 per cent in 1910, dropping to 25 per cent in 1912. This increase is accounted for entirely by an increase in imports of food, drink and tobacco. Empire products were 19.2 per cent of the total of that class of imports in 1900, and, after a more or less regular climb, were 28.6 per cent in 1912. On the other hand, Empire raw materials as a percentage of all imported raw materials contained a very small, if any, element of growth, the percentage tending to fluctuate about its average of 29.1 per cent. A similar tendency is evident for imported Empire manufactures as a percentage of total manufactured goods, which fluctuated about its average of 11.7 per cent.

Such a change holds considerable interest for us in our analysis. Though Great Britain did not suffer any increased dependence on the Empire for raw materials or manufactures, there was a marked increase in her dependence upon the Empire for food. Whether dependence on the former increased or not, it is significant enough that these classes of imports remained stable while the proportion of food imports from Empire sources had increased. Great Britain's unique industrial system with its highly concentrated population had made the problem of securing food supplies an equally, if not more vital problem to that of obtaining raw materials for her manufacturing operations.

IMPORTS AND EXPORTS OF THE EMPIRE

In order to obtain still another slant upon the problem, let us seek an answer to the question: Were the various members of the Empire growing more or less dependent upon the United Kingdom and upon each other? A brief answer may be obtained by treating in summary fashion the exports of all British *dominions, colonies, possessions and protectorates* with regard to their destinations, and their imports with regard to their source. For greater clarity, percentage figures of total exports and total imports will be used. While the data are not sub-classified, exports consisted mainly of raw materials and food, and imports were made up largely of manufactured goods.[18]

Considering first Empire exports in general terms, the changes in the per-

[17] These figures have been computed from data found in the Board of Trade, *Statistical Abstract for the United Kingdom, from 1899 to 1913*, 1914–16 (Cd. 7636), pp. 166–7 and *Statistical Abstract for the British Empire, from 1898 to 1912*, 1914 (Cd. 7241), pp. 97–8.

[18] These percentages have been computed from data taken from the Board of Trade, *Statistical Abstract for the Several British Self-Governing Dominions, Crown Colonies, Possessions and Protectorates, from 1898 to 1912*, 1914 (Cd. 7165), pp. 54–5 and 60–1. (Including exports and imports of bullion and specie.)

centage distribution of these exports between the United Kingdom, the various portions of the Empire itself, and foreign countries, were not great. Take, for instance, exports to the United Kingdom: for the first six years from 1900 to 1905, the average annual share was 42.5 per cent, which figure grew to 44.1 per cent for the remaining seven years. The average annual share of the United Kingdom for the whole period was 43.3 per cent. As for inter-Empire exports, exclusive of the United Kingdom, they averaged 18.9 per cent for the first seven years from 1900 to 1906, then dropped for the remaining six years, averaging but 14.7 per cent of the total. The average annual proportion of Empire exports to foreign countries, finally, acted contrariwise from that for inter-Empire trade, being 38.5 per cent for the period 1900 to 1906 and 41.4 per cent from the latter year to 1912. On the whole, Empire trade does not appear from these figures to have grown more interdependent, although the slight growth in the percentage taken by the United Kingdom may be ascribed some importance for the interpretation of the preference movement. It should be remembered, however, that a similar percentage growth occurred in Empire exports to foreign countries and a decrease occurred in the proportion of inter-Empire exports.

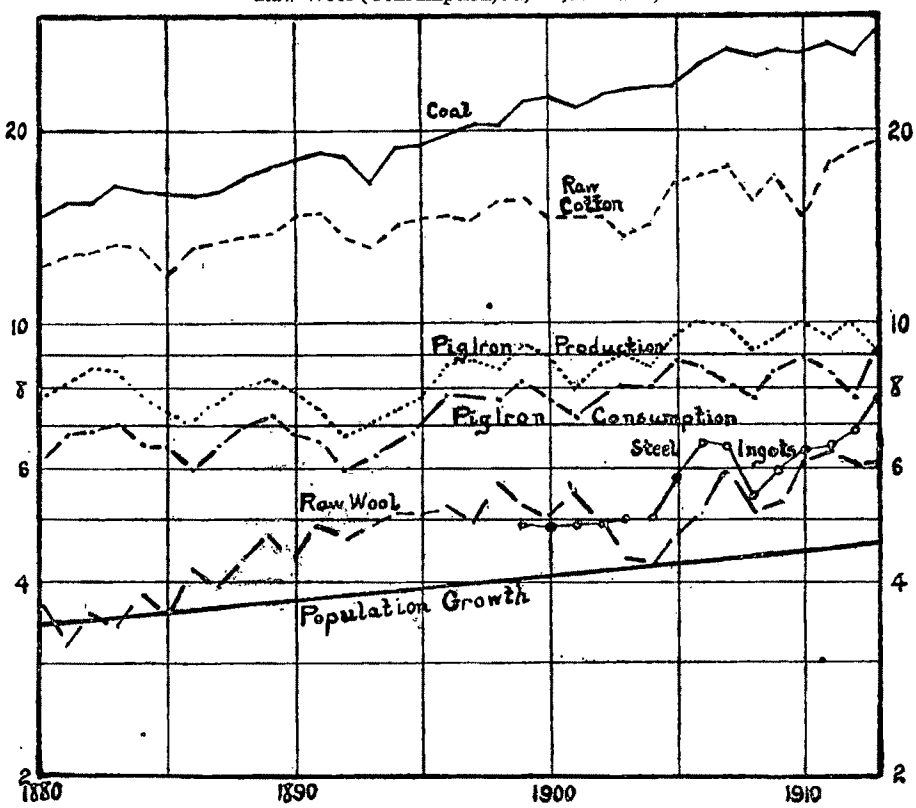
More significant information is revealed by the treatment of imports. The imports of the Empire from the United Kingdom declined from an average annual proportion of 47 per cent for the three years, 1900, 1901 and 1902 to 40.5 per cent for the year 1912, the average annual percentage for the entire period being 44.8 per cent. Imports from Empire sources, as would be expected from our analysis of exports, also registered a decline from an average annual figure of 19.9 per cent for the first five years to one of 16.7 per cent for the remaining eight years. The percentage imported from foreign countries, on the other hand, manifested a notable disposition to increase, rising from 33.9 per cent in 1900 to 36 per cent in 1907 and 44.5 per cent in 1912. This change in the distribution of Empire imports suggests that the colonies and possessions were becoming less dependent upon the United Kingdom, and also less dependent upon each other as time went on. This aspect must not be unduly stressed, however, because the colonies were still dependent for over 40 per cent of their export and import trade on the mother country in 1912, and this is no small percentage. Moreover, 15 per cent more of their trade was among themselves. The Empire was beyond a doubt materially inter-dependent. Yet we must not forget that the 45 per cent of their trade still unaccounted for was with foreign countries, and that this latter portion was growing rapidly, containing a probable element of increased competition for the British manufacturer. It does not seem unreasonable to conclude in the light of these and the foregoing facts of Empire trade, that certain Imperial forces, along with others, were becoming favorable to the protectionist program.

INDEXES OF PRODUCTION

Our analysis thus far has dealt largely with Great Britain's foreign trade as an index of her pre-war economic status. In order to round out this treatment, a brief consideration of the development of the volume of her production, as indicated by data which are commonly regarded as accurate indexes is required. Information, illuminating as to production trends of some of the large staple industries, is contained in Chart 4, which gives curves for the consumption and production of some of the primary

CHART 5—SHOWING VARIOUS SERIES INDICATIVE OF THE PHYSICAL VOLUME OF BRITISH PRODUCTION IN EACH YEAR, 1880–1913

(Logarithmic vertical scale. Unit for Coal (Production), Pig Iron (Production and Consumption), and Steel Ingots (Production): 1,000,000 tons. Unit for Raw Cotton (Consumption) and Raw Wool (Consumption): 1,000,000 cwts.)



materials of British industry.[19] Three of the curves, for *raw cotton*, *raw wool* and *pig iron consumption*, and two for *pig iron* and *coal production* are carried back to the year 1880 in order to provide a long time view. A curve for *steel ingot production* is added from 1899 to 1913 to make the picture of production in the iron and steel industry more complete.

The most patent long-time conclusion to be drawn from the chart is that, on the whole, the volume of production, as revealed by these indexes, was keeping pace with the increase of population, but that it was not increasing a great deal faster. Closer observation will substantiate this inference with one exception. The long time trend of each curve from 1880, save the one for coal production, with due allowance for the numerous intermediate fluctuations, tends to be approximately parallel with that of population. The coal curve, singularly enough, displays a degree of growth somewhat greater. It will be recalled that coal exports were growing in the period before 1902 with considerable rapidity.

Taking a shorter view of the picture

[19] This data has been taken from the Board of Trade, *British and Foreign Trade and Industrial Conditions*, *op. cit.*, pp. 439–47 and the *Abstract of Labor Statistics*, 1914–16 (Cd. 7733), pp. vi–vii.

from 1900 to 1913, a more detailed analysis is required because of the importance of this period in laying the foundation for the post-war protectionist edifice. All of the curves show the effect of dull trade years existing through 1903. Thereafter, all of them, save the two representing pig iron consumption and production, appear to respond with considerable vitality, showing an upward tendency greater than that shown by the line indicating population growth. In percentage terms, they increased more than twice as fast as population for coal produced and wool consumed, about three times as much for cotton consumed, and over four times as much for steel ingots produced. The increase in the production of steel ingots, however, was offset by the sluggish nature of the pig iron production and consumption. Nevertheless, in a situation containing generally such a growing volume of production, it is not difficult to understand why the protective program of the Conservative Party failed to win greater support in the years just prior to the War.

THE STATUS OF THE WORKER'S INCOME

Before terminating our statistical observations of pre-war Britain, it is interesting to note the drift of the worker's status. This is best revealed by indexes of his income.[20] According to the Board of Trade index of money wages in the principal trades (the base year being 1900) wages rose from 83 in 1880 to 100 in 1900. In addition, the Board of Trade's index of the working man's cost of living in the large cities fell from 122 in 1880 to 100 in 1900. In the case of both indexes, the movement was slowest during the last ten years, indicating a reaction from increasing resistance being encountered by British trade. Despite this slowing up, it is quite evident that very real gains were made in the working man's standard of living. The decrease of pauperism in this period is indicative of the same thing, as is also the increase in savings deposits of over two and one-half times from 1880 to 1900.[21]

These gains of the worker did not continue from 1900 to 1913. For example, the index of money wages averaged for the period but 99, and the highest figure was 105, reached in 1913. While the index of the working man's cost of living is not for this period, two other available indexes may be used as suggestive of this. The Board of Trade index of wholesale prices, for instance, after falling to 97 in 1903, rose in the subsequent years to 117 in 1913. The index of retail food prices in London, moreover, rose steadily to 115 in 1913. It is reasonable to suppose that retail costs in general followed somewhat the course of wholesale prices and London retail food prices. Such being the case, with money wages remaining sluggish as they did, the working man plainly was losing some of the gains of the previous period. Moreover, the recovery of wages was being hampered by a large percentage of unemployed in many years. Savings deposits increased 14 per cent,[22] nevertheless, and pauperism decreased 17 per cent.[23] On the whole,

[20] Board of Trade, *British and Foreign Trade and Industrial Conditions, op. cit.*, pp. 259–60. The index of money wages is an unweighted mean of the index numbers of wages in a group of the most important trades. For the index of the cost of living, see *ibid.*, 1904 (Cd. 2337), pp. 31–3. This is a weighted mean of the index numbers for food, rent, clothing, fuel and lighting, the principal items entering into the working man's budget.

[21] *Ibid.*, 1903 (Cd. 1761), pp. 470–1 and *ibid.*, 1904 (Cd. 2337), p. 197.

[22] Board of Trade, *Abstract of Labor Statistics, op. cit.*, pp. 326–7.

[23] *Ibid.*, p. 330.

the working man's position was not precarious, although it was not all that could be asked.

A British Analysis of the Weaknesses in Pre-War Trade

There are other elements in the situation besides the facts which are revealed by statistical data which demand our study. These are reviewed by the analysis of the Committee on Commercial and Industrial Policy after the War, with regard to pre-war trade.[24] The analysis is significant because it reveals what an important and representative British group considered to be the weakness of the pre-war situation. The portion of the report in which we are interested reads:

> Whilst British industry, on the whole, had shown in the preceding decade great vitality and power of extension, its strength and development had been mainly in a certain number of long established manufactures of which coal, cotton and the textile trades generally, shipbuilding and some branches of the engineering trades (such as textile machinery) are the most conspicuous examples. One important exception must be made on this general proposition; the iron and steel trades have made comparatively little progress. . . . In the rise and expansion of the more modern branches of production, the United Kingdom had taken a very limited share; as is evidenced by our relative weakness in respect to the electrical, chemical and chemico-metallurgical industries; and it is admitted that in a number of smaller trades, foreign manufactures have shown greater enterprise and originality.

In short, British industry had failed to acquire diversity in modern development and had been content to progress along staple lines directed by the sheer force of momentum. As a result of this, distinct dangers threatened British industry as a whole, according to the report: *i.e.*, (a) certain branches of production, of great importance as a basis for other manufactures, had come to be entirely under foreign control; and (b) foreign manufactures had secured a strong or even dominant position in numerous other branches of industry, and thus could successfully prevent the establishment of British competition.[25] Moreover, the concentration of her industrial risks in a limited number of staple lines increased susceptibility to trade fluctuations. British ingenuity, the inference is, had failed to fulfill its obligations and had been tactically outwitted in international economic competition.

Summary

In order to relieve any confusion which our detailed analysis may have caused, let us briefly recapitulate. A rapid survey of British foreign trade before 1912 showed that for all British exports there was a retardation after 1870, save for coal and machinery which continued their rapid growth (see Chart 1). This growth and the trend of exports to protected and unprotected markets was the cause of apprehension in some quarters. Imports, on the other hand, showed a constant tendency to increase. Since they contained a growing proportion of manufactured goods, increasing competition must have been felt in the British home market, even allowing for manufactured imports not produced by the British themselves.

Foreign trade after 1900 suffered a few years of hesitant activity but in the

[24] *Final Report* 1918 (Cmd. 9035), p. 21.

[25] *Ibid.* The (a) group included such industries as synthetic dyes, spelter, tungsten, magnetos, optical and chemical glass, hosiery, needles and others named in the Committee's *Interim Report on Certain Essential Industries*, 1918 (Cmd. 9032). The (b) group included such industries as glassware, brooms, and brushes, bentwood furniture and others named in *Report* of Sub-Committee to Advisory Committee to the Board of Trade, 1916 (Cd. 8181).

last half of the pre-war period exhibited an encouraging capacity for expansion. Of the staple industries whose exports were examined more closely, the woolen industries made the poorest showing. Our analysis of the shifts occurring in British markets after 1900 indicated that, in protected markets, British manufactured exports were handicapped by tariff barriers and the competing industrial technique developing behind them. Other foreign markets were erratic, while Empire markets alone were consistent absorbers of British products.

In pursuit of the question of growing Empire inter-dependence as a means of illuminating the preference movement, we found Great Britain becoming increasingly dependent on the Empire for her food supply. On the other hand, the Empire was relying increasingly on other markets for export outlets and also for import sources, making increased competition for the British manufacturer. On the whole, our analysis of Imperial trade from 1900 to 1914 suggested the conclusion that forces from this source were tending to become favorable to a preferential tariff.

A review of production indexes revealed that production was keeping ahead of population in the long run. A spurt was evidenced after the relaxation at the beginning of the century which may account for the failure of the Conservative Party's protectionist program to arouse a more general interest. The worker's status at the end of the period was not perilous. As a consumer his interest lay definitely in free imports.

Finally, we have noted the self-acknowledged lethargy of British enterprise, and the failure to take full advantage of the opportunities created by the expansion of human wants. An unwillingness to sacrifice a large present income to the launching of new industries, seriously limited the diversity of her enterprise. It also dangerously concentrated the risks, weakening the fulcrum upon which a highly intensified industrial civilization rested. This aspect of the problem grows more acute when we recall that two of the great staple industries (coal and iron) were based upon resources whose exhaustion could be foreseen. Quite clearly, we are fully justified in asserting that economic forces were at work which might lead to the demand for a protectionist policy, and that these forces were ripening for a climax. The War stimulated the forces at work and hastened the climax.

CHAPTER V

POST-WAR INDUSTRY AND TRADE AND THE MOVEMENT TOWARD TARIFF PROTECTION

THE changes and shifts brought about by the unusual circumstances of the war period were felt mainly in the succeeding era of readjustment. The dependence of the British economic status upon world trade, with the latter greatly altered and at the point of exhaustion from the long conflict, has conditioned her recovery. Obviously, the influences at work have been inextricably complex and ramifying. It is our purpose in this chapter to treat some of the underlying forces tending to mould the direction of Great Britain's recent economic evolution. Before undertaking

that, however, it will be necessary to give a general impression as to the nature of her trade and industrial conditions up through 1927. Because of the recent availability of abundant statistical indexes, it will be possible to make our analysis more descriptive of the whole situation. Our procedure, therefore, differs radically from that in the previous chapter. It is believed that such a treatment will make possible a clearer understanding of the post-war protectionist developments.

GREAT BRITAIN IN AN INDUSTRIAL DILEMMA

Upon release from war-time pursuits in 1918, British industry set about with astonishing vigor to fill the gaps and omissions created by her long military concentration. Her problem of reconstruction was different from that of her Continental Allies, because she had suffered no physical destruction. The task of readjusting and rehabilitating industry to peace-time occupation was the main one facing her. This was not to be accomplished with the ease one might expect, though the British themselves were deluded into thinking so as the world frantically set about replenishing its depleted stocks. Business men will recall the nature of the times. A seller's market existed, and for the British manufacturers this brought its worries. Raw material sources might easily fail. Hence, British aims were immediately to control sources of supplies, and to maintain as close relations as possible with the dominions in order to share adequately in those supplies under their control.

As a consequence, her whole commercial policy became imbued with an imperial spirit. The attitude she assumed at the Peace Conference, refusing to coöperate with France in the matter of raw materials, was full evidence of this, in the opinion of the eminent French critic, M. André Siegfried.[1] The same critic asserts that it is revealed further by the British control over the export price of coal in the early period following the Armistice, and the 1919 grant of Imperial preference. Under no necessity to cultivate markets during this period of hectic international selling, the outlook of British leaders was distorted by the seemingly fundamental importance of securing raw materials. The primary need of realizing Great Britain's ultimate economic dependence on the export markets of the world was obscured temporarily in their minds.

Circumstances operated to prevent such a situation from remaining long the case. Much of Great Britain's exaggerated activity arose out of the artificial stimulation of continuous world-wide inflation. The inevitable bursting of the bubble brought the British and others to their economic senses. Industry and trade dropped rapidly into the deepest depression. Export trade melted away, and unemployment rose to unprecedented heights. The failure of Great Britain's Continental and overseas customers to absorb her products, and the difficulties encountered due to depreciating exchanges urgently demanded a reconsideration of policy.

Furthermore, Great Britain was having her own struggles with currency in restoring the gold standard according to the stringent recommendations of the Cunliffe Commission. The resulting disparity between external and internal prices unquestionably affected export trade.[2] Depression relentlessly persisted. Protective measures offered doubtful relief in the opinion of leaders

[1] Siegfried, *op. cit.*, pp. 19–24.

[2] *Ibid.*, pp. 29–43. See also, Keynes, J. M., *The Economic Consequences of Sterling Parity* (New York, Harcourt-Brace, 1925).

and the people. Hence, free trade doctrines, though mere shadows of their former selves, were invoked again as the commonly accepted standard of the British economic system. But they did not remain in the ascendancy long; continued dullness in all branches of trade and industrial activity occasioned further recourse to protective devices, the story of which our third chapter related.

INDEXES OF POST-WAR ECONOMIC CONDITIONS

A clear view of the extensive nature of Great Britain's depression is gained from tracing the general movement of business over the post-war period. Four indexes are available which are declared by authorities to illuminate her recent economic trend. They include an index of prices for twenty industrial stocks, the Board of Trade's index of material prices, an index of exports of British manufacturers, and a short money index.[3] All of the indexes are corrected for seasonal variation and are relative to the 1913 average. They have been plotted on Chart 6, which the reader should note carefully following our description.

We readily see that trade followed a steep upward course after the War, reaching a peak about the middle of 1920. This was a time of frenzied activity; all types of businesses and all forms of industry were under tremendous pressure to produce. Production figures for the iron and steel and shipbuilding industries were unusually high. Unemployment figures fell to a lower level than at any period during the years from 1900 to 1914 (2.3 per cent in 1920 and 1.6 per cent in the first nine months of 1921). In addition, the per cent of pauperism was low. Prices, the cost of living and wages, on the other hand, rose to almost untold heights. The index of the cost of living, for example, reached a high point of 276 in October, 1920, and wages 277 in January, 1921. Beginning in the last quarter of 1920, there occurred a precipitate decline into the depths of depression, accentuated by the coal strike of 1921. There British trade and industry has remained to date.

The situation existing throughout 1922 appeared practically hopeless, in spite of a slight improvement toward the end of the year. Never in her long history had the United Kingdom been faced with a more critical trade crisis. The iron and steel industries did not recover, nor did engineering, cotton, woolens and worsteds. The distressing thing was that they did not reveal any signs of such a likelihood. Exports fell off; shipping was unprofitable; shipbuilding was at a standstill; and railway traffic in general merchandise, a fairly good index of domestic trade, was only 80 per cent of its 1913 figure and smaller still when compared with the boom year of 1920. Unemployment reached the astoundingly high level of 23.1 per cent in June, 1921, exclusive of coal miners on strike. Throughout 1922 it remained high, ranging from 14 to 17 per cent.[4]

A PERIOD OF FALTERING TRADE, 1923 TO 1927 [5]

The year 1923 opened, as anticipated, with a degree of recovery and a new spirit of hopefulness. All indexes

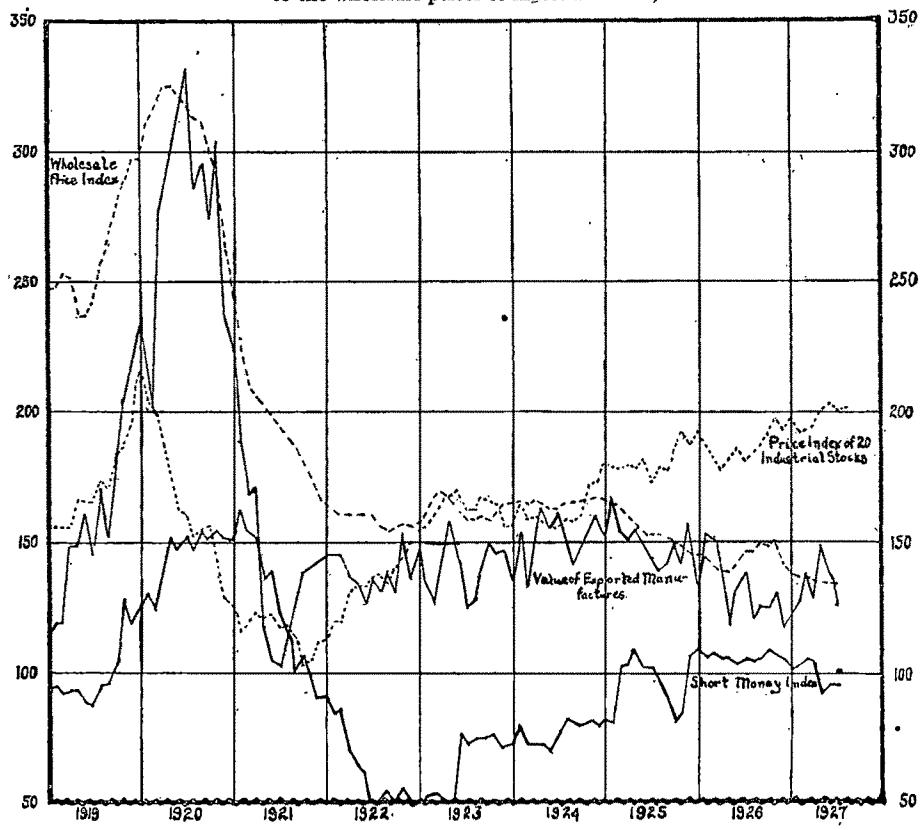
[3] Bowley, A. L. (and others), "An Index of British Economic Conditions, 1919–1922," *Review of Economic Statistics*, Vol. IV, p. 144, and the accompanying statistics, pp. 152–5. See also various letters of the *Harvard Economic Service*, 1923 to date. Chart 6 has been adapted from these sources. Prior to 1923, the Board of Trade index of wholesale prices, instead of material prices, is used.

[4] This index is said by some, however, to exaggerate the degree of depression.

[5] In this connection see the various letters of the *Harvard Economic Service* on British economic

CHART 6—SHOWING FOUR IMPORTANT INDEXES OF RECENT BRITISH ECONOMIC CONDITIONS, MONTHLY, 1919–27

(The data are relative to the year 1913 as the base. After 1923, the Wholesale Price Index is confined to the wholesale prices of materials alone)



encouragingly revealed healthy activity. Reaction followed in the second quarter, however, due to the failure of the export markets to absorb products as expected, the result of unsatisfactory conditions on the continent. In short, for the remainder of the year, the situation was about as follows: shipbuilding, the cotton and worsted industries were in deep depression; iron and steel exports were holding their own; imports were increasing; domestic trade, as shown by general merchandise railway traffic was holding up; and the unemployment situation was improved, although the percentage out of work was still over twice the figure which would have been alarming before the War.

Commodity prices which had remained relatively stable during the years 1922 and 1923 rose somewhat in 1924, falling again in 1925 and 1926, with a recovery in the latter months of this year, but a further fall in the first seven months of 1927. The general

conditions, from 1923 to date. See also the various indexes of British conditions published in the "Statistical Record," *Review of Economic Statistics*, Vols. VI, VII and VIII. These indexes, whose original source is the London and Cambridge Economic Service, are used as the basis of this analysis.

level of money wages which had decreased in the first two of these years, rose again in 1924, remaining stable around 180 the next two years. The cost of living, on the other hand, faltering after its previous decline, rose again in the last of 1923 and first of 1924. After some fluctuation in that year, a further decline occurred in 1925 and 1926.

In 1924, improvements occurred in the textile industries, but otherwise conditions remained the same. The return of the Conservatives to power is said to have had a steadying influence on business. Optimism increased, as did also its material manifestation, imports of raw materials, presaging greater production and exports. Hopes failed to be realized. A return to the gold standard in May, 1925, accentuated a number of problems due to the disparity between import and export prices. A pronounced recession followed in the leading export industries; unemployment increased, a menacing coal strike was threatened, and averted only by government action. In addition, the unfavorable status of industry on the continent continued to affect adversely Great Britain's general commercial position.

The year 1926 was significant largely for labor conflict and declining industry. The failure of the Coal Commission's report to afford a practical basis for compromise led not only to a coal but a general strike. While the general strike lasted only a few days, the coal strike continued until the miners were forced back to work without a satisfactory settlement. Widespread industrial repercussions inevitably accompanied this strife. Production was curtailed in all major fields, intensifying an acute unemployment crisis. The value of exported manufactures fell to the lowest figure since 1921. This decline was most pronounced in such exporting industries as iron and steel, textile machinery, china and earthenware, cotton yarn and piece goods. Moreover, the financial situation growing out of such a severe depression was extremely serious. Unsettled conditions in the overseas markets further complicated matters. The year 1926 came to a close with industry and trade in as dangerous a position as ever in their history.

Despite these facts, optimism was rife in December that the year 1927 would see a rapid and general recovery. As is seen by the 1927 curves on Chart 6, some recovery was in evidence, especially in the late spring months. A pronounced decrease in unemployment in the iron and steel industry, engineering, shipbuilding and commercial trades was evidenced in June, although in the coal areas it continued large due to the failure of export markets. The physical volume of production reached its highest level since 1920.

POST-WAR BRITISH AND WORLD TRADE

Since British trade is so completely dependent on overseas markets, the continued depression in the United Kingdom, as we have suggested, was in a measure a result of conditions beyond her control. Hence, certain questions arise; for example, what has been the general trend of world and British trade since the War? How do the present magnitudes compare with the magnitudes in the years just preceding the War? Is the share of Great Britain's trade an increasing or decreasing share in the aggregate trade of the world?

Replies to these questions cannot be made, of course, with close accuracy. Reliable approximate answers, nevertheless, may be advanced. League of Nations and British experts compute that in 1923, in terms of nominal gold value, the world's trade was 31 per cent

greater than in 1913,[6] 46 per cent in 1924 and 63 per cent in 1925.[7] Splitting this world trade percentage up into imports and exports, imports were in 1923, 30 per cent higher than in 1913, 44 per cent in 1924 and 62 per cent in 1925, while exports were 31, 48 and 64 per cent respectively. For the same period, plus the year 1926, the nominal gold value of British imports increased 45 per cent in 1923 over 1913, 56 per cent in 1924, 77 per cent in 1925 and 88 per cent in 1926. Exports, on the other hand, showed an increase over 1913 of 41, 38, 46 and 24 per cent respectively. When we consider these increases in British trade as percentages of the increases in world trade, interesting facts are revealed. British imports as a percentage of total world imports, to quote the precise League of Nations figures, increased from 16.48 per cent in 1913, to 17.89 per cent in 1924 and 17.79 per cent in 1925. British exports as a percentage of the total world exports, on the other hand, actually decreased from 13.93 per cent in 1913 to 13.01 per cent in 1924 and 12.43 per cent in 1925.[8] Naturally with the curtailment of British export trade in 1926, which we have noted previously, a further decrease in the percentage of British export world trade would appear.

It will be seen at once that little comfort can be derived by the British economist from a study of world trade figures. When it is recalled that, in the same period, world prices of commodities measured in nominal gold values were variously from 50 to 60 per cent higher than in 1913, the situation becomes serious.[9] World trade, reduced in terms of 1913 prices, was in 1923 only 85 per cent of the 1913 figure, in 1924, 98 per cent and in 1925, 104 per cent.[10] Possibly if 1926 figures were available a further slight gain would be shown. This means that in actual volume of world trade there has been but a small gain and that only in the most recent years. It means further that the increased percentages of British and world trade in terms of gold value really conceals a diminution in the total volume of British trade. When adjusted to 1913 values we find that British imports were, in 1923, 86 per cent of their 1913 figure, 90 per cent in 1924, 106 per cent in 1925, and 127 per cent in 1926. British exports, on the other hand, were respectively 81, 77, 89 and 83 per cent of their 1913 volume.[11] Stated in terms of the League of Nations index of quantum of trade, British imports were in 1923, 93 per cent of their 1913 quantity, in 1924, 104 per cent and in 1925, 108 per cent, while exports for each of the respective years were 75 and 76 per cent in terms of 1913 quantities.[12] This shift in volume may be seen more clearly by the accompanying chart, Chart 7, adapted from the *Board of Trade Journal*, which shows imports and exports for 1925 and 1926 compared with the averages for 1909–13, the values throughout being adjusted by the Board of Trade index number on the base of the average prices of 1924.[13]

[6] The 1923 figures are from the Committee on Industry and Trade, *Survey of Overseas Markets*, p. 667.

[7] The 1924 and 1925 figures have been taken from the League of Nations, *Memorandum on the Balance of Payments and Foreign Trade Balances, 1911–25* (Geneva, 1926), pp. 131–5.

[8] *Ibid.*, pp. 132–3.

[9] Computed from League of Nations figures, *Ibid.*, p. 135.

[10] Committee on Industry and Trade, *op. cit.*, pp. 3–4.

[11] Adjusted prior to 1926 by the Federal Reserve Board indexes of British import and export prices and in 1926 by the Board of Trade all-commodity price index.

[12] League of Nations, *op. cit.*, p. 148. These figures contain approximate adjustments for the Irish Free State.

[13] "Imports and Exports in 1925 and 1926," *Board of Trade Journal*, Vol. CXVIII, pp. 94–5.

THE DECLINE OF PURCHASING POWER IN OVERSEAS MARKETS

There are doubtless many reasons which may be assigned for the falling off of British trade in this post-war period. Our previous analysis has suggested some. Among the most pertinent of these is the decline of purchasing power in nearly all countries.[14] This has been due mainly to the general derangement of the economic mechanism of the world, and the widespread political alterations resulting from the Versailles Treaty. The influence of impaired consumption has been present in nearly every country in greater or less degree. Hence, its effects have been universal. Such an extensive decline of demand inevitably affected Great Britain, dependent as she is upon her export trade.

The decline of purchasing power has been perceptibly greater in the countries of central and eastern Europe, and in the near and far east, than elsewhere. Political conditions have dislocated the markets of India, China, and Russia, while others have been temporarily destitute because of financial disruption and a chaotic condition of currency and exchange. In addition, the mere fact of generally and rapidly declining prices has tended to discourage purchases for more than immediate needs. The general recovery of price and exchange stability in the last few years, of course, has tended to make this a less important element. Furthermore, it has been accompanied by some recovery in purchasing power, especially in central Europe. Nevertheless, on the whole, a curtailed purchasing power will doubtless characterize overseas markets for some time to come.

[14] Committee on Industry and Trade, *op. cit.*, p. 4

THE GROWTH OF LOCAL MANUFACTURE AND ITS EFFECT UPON BRITISH TRADE

A tendency always exists for the development of local manufacture to satisfy needs formerly supplied by imports.[15] Ordinarily, this process of substitution takes place slowly in a normal way and allows time for the necessary adjustments in the flow of trade. The World War had the effect of stimulating such development in many countries. Moreover, the War led to the establishment of industries which were essential to the demands of military activity. While many of these naturally vanished with demobilization, others continued to exist either through a natural capacity or some kind of protection obtained on the basis of national security, or general grounds of commercial policy.

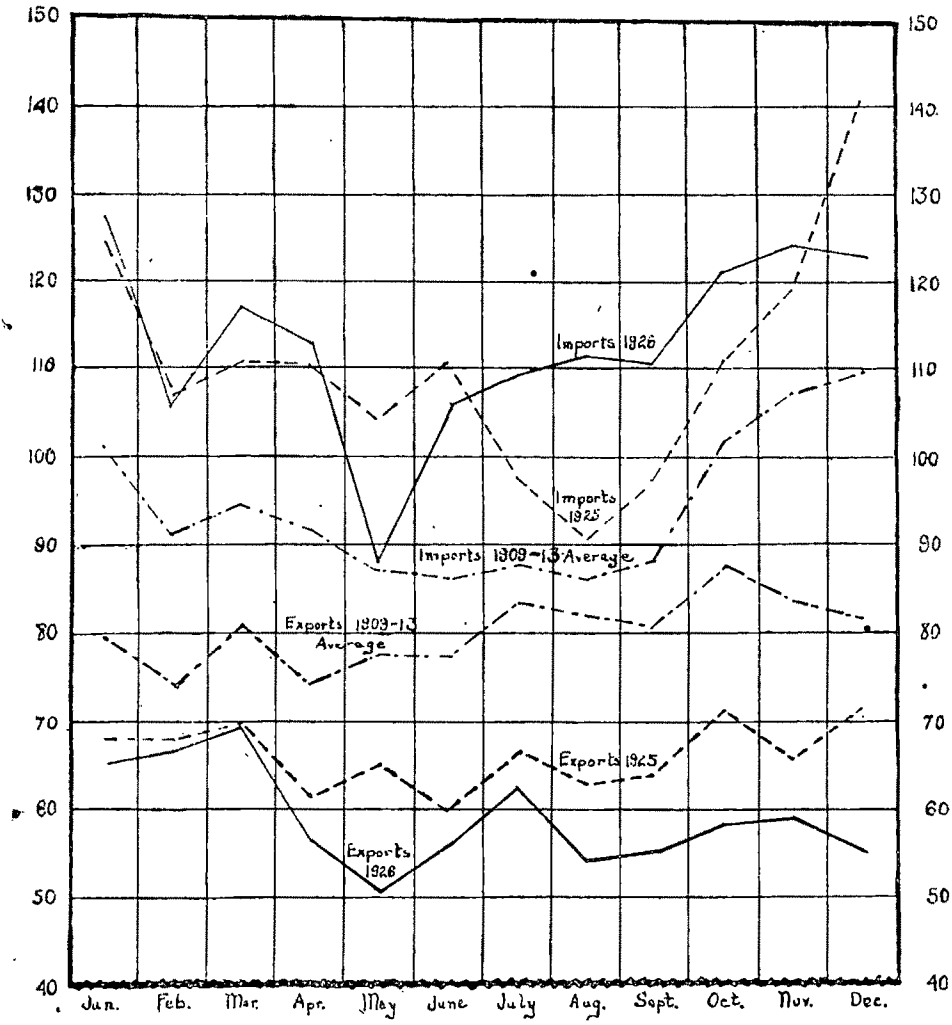
Among the principal markets in which local manufactures were growing up were Canada, Australia, India, Brazil, Argentina and Chile. The movement had been given an extra stimulus by the growth of intense nationalism and was fostered by various means of governmental action. This growth of local manufactures may have reached a state of overdevelopment, and will probably experience a contraction in the future; but for the time being, it has had a seriously restrictive effect upon established trade in general and British trade in particular.

The situation just escapes being hopeless from the British point of view, because of two offsetting considerations. The first is that new manufactures are largely concerned with simpler and coarser classes of goods, the field of international trade being left to engage itself in the manufacture of quality goods. There has been a tendency for British exports to consist

[15] Adapted from *ibid.*, pp. 9–13.

CHART 7—SHOWING BRITISH NET IMPORTS AND EXPORTS IN 1925 AND 1926 COMPARED WITH THE AVERAGES FOR 1909–13

(Values adjusted in accordance with 1924 average prices. Allowance has been made in the 1909–13 curves for the effects of the separation of the Irish Free State. This Chart has been adapted from the *Board of Trade Journal*)



more and more of quality goods. Thus, this movement in international trade may be beneficial to British industry because it operates to offset disadvantages in comparative costs. It also may mean that in the future the larger share of international trade will be captured by exporting countries "most capable of adapting their production to special qualities of goods." Such adaptability was not clearly evidenced in British pre-war exports.[16]

The second compensation is more elusive but may be just as important in the long run. It is the fact that new industries create new wants for plant and materials, and also make additional

[16] See above, p. 74.

purchasing power for those whom they employ. For example, the increase of wealth in the United States accompanying its industrialization has given rise to a "luxury demand almost irrespective of price" which has benefited British products. It was accompanied by a slowing down of American food exports, which, in turn, has stimulated their increase from other areas and created a demand for British products there. It is clear from the foregoing illustration that this consideration is complex and difficult to trace. The basic condition in its analysis is that the capacity of markets to absorb is limited, in any case, by the outlets available for their exports; and it must not be forgotten that all such shifts in international trade are accompanied by temporary loss and suffering. The diminishing margin of profit which tends to characterize modern industry makes it especially susceptible to such shifts.

THE GROWTH OF FOREIGN COMMODITY PROTECTION AND BRITISH TRADE

The growth of various sorts of governmental protection has been a concomitant to the development of local industry. Such a growth has been accomplished principally in four ways: (1) by means of customs tariffs; (2) by means of prohibitions or restrictions, with or without a system of licenses; (3) by means of special privileges, concessions, or subsidies to local industries; and (4) by means of state control and monopoly.[17] Of these, tariff measures are easily the most important. The question arises as to the extent to which British trade has been limited by their growth from the period before the War. British authorities have made a study of the problem (1924), and reached the conclusion that:[18]

> . . . the average increase of tariffs on articles selected as representative, *i.e.*, the increase of charge expressed in terms of sterling per unit of product (not per unit of value), has not materially exceeded the average increase in value of the articles exported.

This is the same thing as saying that, up to the time of the study, the average *ad valorem* incidence of tariffs has not materially increased. It suggests that tariffs have not been an important factor in retarding the recovery of British trade. The same level of tariffs being retained and a fall occurring in prices, they inevitably have a greater effect, because the *ad valorem* incidence of specific duties is automatically raised. Hence, where price declines have been significant tariffs have played an increasingly important part in restricting trade. That such has really been the case may account for the prominence of tariff discussions in the recent meetings of the League of Nations' Economic Conference, the International Chamber of Commerce and the Inter-parliamentary Congress. It is further suggested by the distribution of British trade to ten of the principal protected countries whose tariffs were closely analyzed in the study referred to, this group taking 36.6 per cent of her exports in 1913, 37.2 per cent in 1923, 33.9 per cent in 1924, 34.9 per cent in 1925, and 29.8 in 1926.[19]

Concerning other forms of trade restriction for the purpose of protection, the use of prohibitions and restraints has been especially prevalent since the war. In some countries, particularly

[17] Adapted from the Committee on Industry and Trade, *op. cit.*, pp. 13–21.

[18] *Ibid.*, p. 14.

[19] This group included the United States, Germany, Argentina, France, Japan, Brazil, Belgium, Italy, Spain and Sweden. See *ibid.*, pp. 545 and 646–8. Also the various articles in the *Board of Trade Journal* on the annual distribution of British foreign trade.

those in central Europe, they have become a predominant feature. After some experience with these measures and their effects, there has appeared a tendency to reduce them to a minimum. Special concessions, privileges and subsidies have been granted to various industries, most important of which has been shipping. This action among foreign countries, the United States, for example, has been very injurious to British shipping. The shipping interests have also been the principal ones affected by state control or monopoly. The number of countries operating or controlling commercial shipping has increased to include the United States, Belgium, Roumania and Soviet Russia.

COMPETITION BETWEEN BRITISH EXPORTS AND THE EXPORTS OF OTHER COUNTRIES IN OVERSEAS MARKETS

An opinion commonly expressed by British trade leaders, especially during the period of the War, was that their exports into overseas markets were being widely displaced by imports from other sources.[20] This sentiment was, in part, a reflection of the intensity of competition immediately preceding the War. It was also in part an expression of fear concerning Britain's chances of regaining her foreign markets. Apparently, there was no evidence of such an event occurring.[21] Some competitors have improved their position or have retained it unimpaired; while others have suffered and are in a greatly weakened condition. Germany, for example, practically disappeared from the markets, and has had difficulty regaining her place, although she has made some strides in that direction. Reparation payments may stimulate her recovery. France, on the other hand, has become an important industrial country because of the acquisition of mineral wealth as a result of the Treaty. The United States is also in a strong position with regard to the trade of the world; while Belgium, an important trading country before the War, has not entirely recovered her position. Among other competitors, Italy has acquired strength in certain textiles, and Japan, also strong in textile production, retains a formidable place in still other lines.

Prominent among the influences aiding some countries to improve their situation has been depreciated currencies. Another which has handicapped certain countries in their recovery has been the shortage of capital. These factors appear to be of a transitory nature but may have effects which will persist far into the future. British trade does not seem to have suffered ill treatment in the markets of the world, and, in general, stands on about equal footing with other countries. She enjoys distinct tariff advantages in trade with the dominions, and a real advantage accrues to her from France's minimum tariff schedule which is not enjoyed by any other important commercial nation.

THE GROWTH OF BRITISH PREFERENCE AMONG THE DOMINIONS AND ITS VALUE TO BRITISH TRADE

It will be recalled that nearly all the self-governing dominions, except Newfoundland, granted preference prior to the War. After the War, the same group continued—indeed, increased—their preference grants. For example, in 1914, the preference granted by the dominions was on the average higher than their general tariffs by about 4 per cent *ad valorem*. By 1925, this

[20] See, for example, Hewins, *op. cit.*, Chapter IX.

[21] Adapted from the Committee on Industry and Trade, *op. cit.*, pp. 21–3.

preferential advantage had been increased to 9 per cent *ad valorem*.[22] The increases, *ad valorem*, for the various dominions, have been as follows: 8 per cent in the case of Australia; 8½ per cent in the case of New Zealand; 2½ per cent in the case of Canada; while the level of preference in South Africa has remained relatively unchanged, although she has removed preferences in lines where Great Britain has led the competitive field. With regard to India, no preference could be granted by her before the War because of the dominating influence of the British in her governmental administration. During the War her government was reorganized, leaving her with a large degree of fiscal independence. Since that time she has taken several protectionist measures and embodied them in tariff enactments. It is the hope of many of the British that India will shortly arrange to grant such preferences as are consistent with her tariff policy.[23]

It is extremely difficult to obtain any measure of the benefit of preference to British trade. The influence of coöperative effort to execute the War effected closer economic relations in the Empire and should certainly be stressed. All effort was made at that time to divert the greatest possible proportion of colonial and dominion exports of food and raw materials into the United Kingdom. In some cases, official purchases by the British Government were of paramount importance in directing this flow. The British themselves are quite convinced that a beneficial effect has accrued from preference. One statement from an authoritative source has even asserted that there is left "no room for doubt that the advantage has been substantial."[24]

In confirmation of this, the percentage of British exports taken by various parts of the Empire rose as follows from the annual average for the ten-year period from 1904 to 1913.[25]

	Per Cent
Annual average, 1904–13	34.8
1922	37.5
1923	37.2
1924	38.5
1925	39.2
1926	44.8
1927 (first quarter)	43.02

This increase in exports to the Empire has been largest with the dominions, and especially with Australia, which received 9.9 per cent of the total British exports in 1926 and the first quarter of 1927. A slight increase also occurred in the percentage of exports to New Zealand and South Africa, but not to Canada. Exports to other possessions increased slightly from 6.3 per cent in 1913 to 8 per cent in 1925, 8.6 per cent in 1926 and 9 per cent for the first quarter of 1927. Those to India, on the other hand, fell off slightly from 13.4 per cent in 1913 to 11.8 per cent in 1925, recovering to 13.3 per cent in 1926 and 12.3 per cent for the first quarter of 1927.

Imports from the dominions and possessions also increased, being 24.9 per cent in 1913, 27 per cent in 1924, 29.6 per cent in 1925, 27.3 per cent

[22] Committee on Industry and Trade, *op. cit.*, p. 24. In addition, preferences are now granted by a number of dependent colonies, ranging from 3% to 25% *ad valorem*. See pp. 551–3.

[23] *Williams, L. F. R., India in 1924–25* (Gvmt. of India Central Pub. Branch, Calcutta, 1925), pp. 166–73.

[24] Committee on Industry and Trade, *op. cit.*, p. 24.

[25] These figures exclude exports to the Irish Free State. See articles on the distribution of trade published in various issues of the *Board of Trade Journal*. In this connection, it should be recalled that the actual volume of British export trade in the post-war years has been very much lower than the 1913 volume. See above, pp. 83–4.

in 1926 and 26.8 per cent in the first quarter of 1927. No outstanding shift in the percentage taken from any single dominion is observable, although most of the increase is accounted for by the imports from Canada, Australia and New Zealand. From India, imports like exports have decreased from 6.3 per cent in 1913 to 4.8 per cent in 1926 and 5.04 per cent for the first quarter of 1927. This growth in trade with Empire markets, coincident with the growth in preferential allowances, is the basis for the conclusion regarding the benefits of preference, a conclusion which must be carefully qualified.[26]

Further qualification is needed, too, when we consider the extent to which the United Kingdom shares in the total imports and exports of the self-governing colonies.[27] In every case, from 1913 to 1925, there has been a decrease ranging from 4 to 8 per cent in the percentage of imports received from the United Kingdom. Save in the case of New Zealand, there has likewise been a decrease in the percentage of dominion exports sent to the mother country, amounting in the case of South Africa to 32.5 per cent. It must not be forgotten, however, that the volume of trade carried on by each self-governing colony with the United Kingdom remains a significant proportion of their total trade. Doubtless, rather than admit the failure of preference to benefit them, the dominions would contend its application had been insufficiently extensive. It is from the point of view of Great Britain, however, that a justification of post-war preference must be sought. Certainly the admission of the importance of preference by the Committee on Industry and Trade lends the weight of official sanction to the protectionist argument that the policy of free imports no longer meets the exigencies of British trade.

SUMMARY

Having described generally the depression obtaining in British industry and trade up to the present time, we have seen on close analysis that the post-war period has witnessed a very considerable shrinkage in her trade volume.[28] Four underlying influences which have been assigned special importance in causing this shrinkage were reviewed carefully: first, the decline of purchasing power in overseas markets; second, the growth of local manufactures; third, the growth of foreign commodity protection; and fourth, the state of competition in the export markets. Finally, we noted the growth of preference among the colonies and the statement of the Committee on Industry and Trade concerning the value of preference, and examined the available trade data which might support such a view. Considerable

[26] Professor Henry Clay points out, in this connection, that the real explanation of increased exports to Australia and New Zealand lies in the recent outburst of prosperity in these dominions, and also in the fact that these markets have been the recipients of large loans from London since the War. Professor Clay believes that there can be no effective preferential scheme without a general system of protection, which does not suit the needs of the English economic system. See his article, "Imperial Economic Relations," *Manchester Guardian Commercial*, Vol. XIII, pp. 445-6.

[27] The figures which have been used in this connection are found in the League of Nations, *op. cit.*, pp. 158-61.

[28] A very good brief presentation of the economic problems confronting Great Britain at the present time is contained in a statement submitted to the recent International Economic Conference (Geneva, May, 1927) by the British members of the Conference. See the documents of the Conference, League of Nations, *Principal Features and Problems of the World Economic Position from the Point of View of the Different Countries*, C. E. I. 29, 1st series (Geneva, 1927), pp. 18-25.

qualification appeared to be necessary. Before concluding finally upon Great Britain's post-war industry and trade and the movement toward protection, let us regard it in relation to our previous development, passing such judgments as seem warranted in the light of our entire treatment.

CHAPTER VI

CONCLUSION

THAT a pronounced trend toward tariff protectionism has occurred in Great Britain in recent years has been evidenced in the historical facts here assembled. Its embryonic origins, both political and economic, have been seen to lie many years in the past. We may fairly wonder where the ultimate end may be. Is a return to simon pure free trade, for example, within the realm of possibilities? If not, will Great Britain, when faced with the international consequences of a protective system, hold out to the world as a protagonist of free trade, while within the Empire, advancing and extending a program of preferential protection?[1] Have international trade conditions so altered as to warrant the overthrow of the traditional free trade principles as the basis of her tariff system? Is it at all probable that Great Britain might erect a general protective system? Would such a change be desirable from the standpoint of her own self-interest?

These and countless other questions have doubtless arisen in the mind of the reader. No complete answer can be made to them, but we may appreciate the significance of current trends in the light of the facts which have been related. The policy of free trade, when adopted, unquestionably was an important factor in enabling Great Britain to gain an enormous advantage in world trade, other factors, of course, contributing. Propitious circumstances, in other words, during the period from 1851 to 1901, permitted an extraordinary development of industry, trade and commerce.

Rising standards of living were witnessed on every side. Population, confirming the Malthusian conclusions, rose from 27.4 millions in 1851 to 41.5 millions in 1901, an increase of 51 per cent, tending to fill the gaps opened by rising standards. The importance of this is appreciated more thoroughly when we recall the limited area of the British Isles. In other words, the increased concentration of population which accompanied Great Britain's economic expansion, meant a highly compact industrial civilization largely dependent upon foreign sources of supply for its principal foods and raw materials. The maintenance of existing standards, or slightly rising standards of living, for such an increasing population, thus was dependent upon the growth of trade at an equal or a slightly faster rate. On the other hand, anything which might interfere with or interrupt the required circular flow and growth of commerce would be attended with disastrous consequences.

The last century saw this development go on almost unhindered up to 1873, with a slowing down after that year. The continuity of its increase was maintained, however, through the fourteen years following 1900. Population growth continued to persevere, likewise, increasing 9 per cent more

[1] M. André Siegfried suggests this. See his book, *op. cit.*, p. 29.

from 1901 to 1911. In 1914, the dreaded interruption occurred, despite which population increased 4 per cent more before 1921. What has happened since, the far-reaching nature of British depression with its extended unemployment, has been reviewed. Hardship and distress have prevailed necessarily among many classes. Although the average level of "real" wages for full time work was not substantially different in 1925 from the pre-war level, if allowance is made for the widespread unemployment and short time employment prevailing in many industries, the average level of "real" weekly earnings has been much lower than it was immediately before the War.[2] Reduced incomes in many groups, therefore, have resulted in a measurable lowering of their standards of living.

The situation, in view of the population figures, is tense. Britain, in consequence of the pressure she must feel, is obliged to do all in her power to maintain the operation of the economic system which she has built up. Things must be kept running at all costs. It is no wonder, perhaps, that her leaders have been tempted to grasp at the alternative of protection when the machine has failed to operate smoothly under free trade. Doubtless, no government could be expected to hold to the broad and enlightened reasoning of orthodox economic teaching in circumstances rife with dangers. The British leaders are forced to witness the pressure of world forces on the means of national subsistence now as never before. In short, to the political party in power charged with the responsibility of trade recovery (especially if it be already possessed of protectionist inclinations), the straight and narrow path of free trade has become a thorny road; while the various ways of protection have appeared as the paths of possible solution.

[2] Committee on Industry and Trade, *Survey of Industrial Relations*, 1926, pp. 96–8.

Returning to our story of free trade and protection, let us regard some of the important facts relating to the origin of the former. Historically, authorities generally agree that its adoption arose from the practical pressure of self-interest among the manufacturing classes, whose conviction of its efficacy constituted the chief basis of its support. The outburst of prosperity and the growth of trade following the application of a free import fiscal policy led to its general acceptance by the popular mind. Any question of its merits thus became superfluous. As a national policy, it acquired a traditional and sentimental aspect which tended to become ingrained as a strong popular bias.

With the first great depression (1868), there appeared to be some question of the soundness of the policy. The growth of tariff barriers abroad obstructed some of the most important outlets for British products; and the development of an industrial technique behind them increased competition. Such barriers and accompanying competition were not only becoming common with foreign countries, but increasingly frequent in the self-governing colonies. More than that, the periodic recurrence of depression in the three decades following this date stimulated an "off and on" protectionist agitation, keeping the issue thoroughly alive.

In the last fifteen years of the nineteenth century, there occurred the first meetings of colonial and British representatives in conference, bringing with them the initial suggestions of an Imperial tariff system, based on the principle of reciprocal preferential treatment. Coincident with these Colonial Conferences was the growth of a new

popular interest in the Empire, and the turn of the century was marked by the awakening of colonial concern.

The idea of an Imperial tariff system, based upon the principle of preference, expanded into a movement of large proportions, and made propitious such a campaign as was carried on by Mr. Joseph Chamberlain from 1902 to 1906. Among the events of practical significance which aroused much thoughtful consideration of the problem at that period were: (1) the increasing difficulty of surmounting foreign tariff barriers, the expansion of competition, and the frequency of trade depressions, which we pointed out above; (2) the willingness and desire of the self-governing colonies, as expressed at the Colonial Conferences of 1887, 1894 and 1897, to participate with the mother country in a comprehensive preferential system; (3) the actual granting of preference by the Canadian Government to the products of the United Kingdom in 1897; and (4) the receipt of definite proposals from the various dominion governments at the 1902 Conference.

The policy of free imports, however, was too deep-rooted in British state and popular tradition to be altered so readily. Furthermore, trade had been good from 1898, save for a slight reaction in 1903 and 1904. A protective tariff or any extension of customs duties for preference purposes, therefore, held little allurement for business interests and was even more distasteful to the consuming classes. The really important result of the Chamberlain campaign was that it committed the Conservative Party to the idea of a tariff for protection, although temporarily at the price of office.

From 1906 to 1914 the dominions continued to bring pressure to induce at least a change by a preference grant on existing duties. But the British Government, under Liberal leadership, adhered closely to the policy of free imports. Pressure was manifest especially in the two Imperial Conferences of 1907 and 1911. It was also brought into practical prominence by the preference grants of the various dominions in accordance with their proposals of 1902.

In a subsequent chapter, after examining the changing distribution of British trade during the period from 1900 to 1914, we noted the growing importance of the self-governing colonies and other possessions as sources of food supply, and their continued value as sources of raw materials. Moreover, as export markets they possessed considerable importance. Hence, there is reason to believe that this colonial pressure eventually might have forced the preferential principle into the British tariff, without the stimulation given to the movement by the War.

That the foregoing belief would have materialized, of course, cannot be more than asserted. The declaration of war certainly brought in its train a succession of extraordinary conditions. For example, the fact that British industry found itself without certain vital and essential commodities, whose production had been controlled by enemy interests, exerted a profound influence. It was, in fact, fundamental in causing the enactment of legislation safeguarding "key" industries soon after the close of the war, and its permanent continuance, at least as far as one can reasonably foresee, in the British tariff. With the growing intensity of popular war feeling, there came to prevail a general fear of the economic designs of the enemy countries, and a widespread delusion concerning their preparations for post-war economic conflict. The Paris Resolutions and their acceptance by a Coalition Government, in which the Liberal (free trade)

Party predominated, illustrates the importance of this force and the foregoing one.

Among other important factors, there was the opinion generally held that Great Britain would have to meet unusual competition in regaining old world markets and in securing new ones in the post-war period. The various reports of the Lord Balfour of Burleigh Committee suggest the extent to which this force was effective in influencing public opinion. The response of the dominions in supporting Great Britain in her war program is also important for us to recall at this time, because it made such an undeniably deep impression upon the British mind. The unanimous approval given the preference principle by the 1917 Imperial War Conference, and the subsequent expression in the British preference grant of the 1919 Budget, unquestionably were made possible by the war stimulus to Imperial sentiment.

The enactment of the McKenna duties was the first step taken in utilizing the British tariff for protection during the War. The continuation of these duties in the period following the War was made possible by the momentum initiated by the above-named forces. In other words, British statesmen and business men had come to look upon the idea of tariff protection first with tolerance and then with sympathy, themselves scarcely recognizing the many subtle forces that were at work changing their attitude.

In the post-war period, the paramount influence at work in promoting the spirit of protectionism has been the unprecedented depression in British trade and industry described in the preceding chapter. The necessity of keeping the machine going at any cost, as we emphasized earlier, has led to a grasping at every possible expedient. Mr. Baldwin's justification of his general protective proposals, when he appealed to the country in 1923, is illustrative of this. The same sort of pressure has been evident in the more recent application of the new safeguarding policy; namely, that of maintaining those industries suffering from extraordinary competition at the expense of industry as a whole. The tremendous problems which have faced the United Kingdom as a dependent manufacturing nation with a highly localized industrial population, have effected a willingness to accept a reconsideration of the tariff issue.

The post-war problems, of course, have arisen from a number of sources. Among the most important are the decline of purchasing power in overseas markets; the growth of local manufactures; and the growth of foreign commodity protection. These are complicated by the obligation to America which Great Britain has agreed to pay, and by the payment of German reparations to the Allied Powers. Certainly, a combination of such elements would seem to place the United Kingdom in a defensive position commercially, and would tend to establish a state of mind conducive to the application of all manner of protective measures.

The British preference advances of the 1923 Imperial Economic Conference and their subsequent adoption in 1925, are of considerable significance. British trade with the colonies and dominions increased from 1913 to 1926, it was pointed out, far more than it increased with other countries (although this was an increased percentage of a greatly diminished total volume). Europe, however, Britain's other large customer, was suffering from an extended depression, complicated by high tariff barriers. In addition, trade with the United States had experienced little increase over

1913. In the same period, on the other hand, there was a general increase in the average rate of preference granted by the self-governing dominions. With rising tariff barriers abroad, the experience of a war shortly past in which the colonies rendered invaluable assistance, and growing trade with the colonies, it would seem that additional developments along the line of preference would be likely. The 1926 Finance Bill, guaranteeing as it does all existing preferences for a period of ten years and the further extensions of the 1927 Budget are in confirmation of this.

The broad fact remains that Great Britain has become a protectionist nation with regard to her tariff.[3] Of course, a retreat to a complete free import policy is not outside the realm of possibilities. Yet, when we consider the extent to which tariff protectionism has been carried, and thoughtfully weigh the conditions of British and world trade, it does not seem likely that such will occur, at least in the immediate future. On the contrary, we may expect, excepting an unlooked-for trade revival, that further use of the tariff for protection will take place. Probably, it will be along lines already established; namely, safeguarding and preference. The longer the process is continued, and the deeper rooted and institutionalized the system becomes, the more concerned the vested interests will be in its maintenance, and the greater its chance of extension and permanence.

That Great Britain will become protectionist in the manipulation of her tariff to the extreme extent that some other nations, as the United States, have become protectionist, it would be beyond all reason to assert. What is evidenced by our survey of the facts is that the United Kingdom has become involved with regard to her tariff in a type of protectionism which has supplanted, to all intents and purposes, her traditional policy of customs duties for revenue only.

[3] Despite the fact that a recent British official statement asserts that the whole of the goods liable to the "new" duties only amount to 2% or 3% of imports. See the League of Nations (International Economic Conference), *Principal Features and Problems of the World Economic Position from the Point of View of the Different Countries, op. cit.*, p. 25.

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EDITOR'S FOREWORD

THIS volume is an effort to place before the layman in untechnical language some of the salient facts as to the progress which the law is making in coping with modern human problems. Each contributor is well qualified to write upon the subject assigned to him. Each is now engaged in active work in one way or another connected with the subject of his contribution. The result is, therefore, a practical statement of progress from persons whose duties and activities are making that progress possible.

George Sharswood, the great Chief Justice of Pennsylvania,[1] quotes an English judge as saying: "No attorney is bound to know all the law; God forbid that it should be imagined that an attorney, or a counsel, or even a judge, is bound to know all the law."

In view of this difficulty the reader may readily expect that from a group of writers such as these he will reach a closer understanding of those portions of the law which are discussed than could be the case if one man wrote the entire volume.

No attempt is made to cover the whole field of law. What we have are the independent statements of over twenty-five persons on particular phases of the subject. An expert has been defined as anybody away from home and a specialist dismissed with the description, one who knows more and more about less and less. We do not make use of either of these terms in connection with the contributors. They are, however, practical men. They all declare, from different points of view, that the law is confronted today with enormous problems and that it is struggling manfully to solve them and we may accept their presentation as frank and unbiased. Their argument as to what should be done to remedy the various situations merits careful consideration.

The fact that each man treats a different topic eliminates the occasion for much serious disagreement as to fundamentals. Where such disagreement does exist the layman will observe the arguments pro and con and will then understand why more progress has not been made—because we are not certain as to the next step.

The editors have studiously refrained from revising the articles as received. Each contributor has been encouraged to present his independent thought in his own way, even with the risk of a difference of opinion and lack of uniformity of thought in the book. The subjects have been arranged with a view to grouping problems that are related rather than on the basis of the remedies to be applied. It is inevitable that there should be some overlapping of ideas under these circumstances. What is more essential is that the reader should understand the relationship of one article to another so that the volume may appear as a coördinated whole rather than an unrelated series of documents however interesting in themselves. It is hoped that the following brief survey may help to accomplish this result.

THE CONTENTS OF THE VOLUME

The first task is to give the reader an adequate background for understanding the problems of the law at the present time. For this purpose Dean Pound (pp. 1–9) tells us the conditions surrounding the struggle to make the law and legal machinery of practical value to the individual.

[1] "Professional Ethics," p. 78.

Part I brings the reader at once into the arena. Every one will realize that there are in general two sets of problems—one relating to what legal rights should be created and the other defining how those rights shall be administered. Part I deals with the substantive law—by which rights are created. It would be quite possible to prepare several volumes on this one subject. Of the many topics those presented seem particularly timely.

Professor Goodrich (pp. 10–14) describes the strenuous effort on the part of the Bar to get together into understandable compass all these rules of law and the variations of them as a basis for further scientific development. He would have us understand the "enormous change" in the amount of the law and the "complexity and uncertainty" which result to the practising attorney. His remedy is a restatement of the common law.

The next two articles deal with special phases of the tremendous growth and "confusion of tongues" with which the American Law Institute is dealing.

Mr. Chamberlain (pp. 15–25) writes on changes in the rights of individuals with respect to the family relations. He limits his discussion to law as created by the legislatures and gives striking illustrations of the way in which "the changing mores" are "modifying the customs of society." He shows us the law confronting the concept of independence of the individual which would exalt the individuality of the married woman and the counter concept of much earlier acceptance that the unity of the family was to be secured by making the married woman a subordinate member of the group. Judge Rosenberry (pp. 26–30) discusses the equally interesting tendency of those who make law to include in its scope problems which earlier ages have thought better solvable elsewhere. He notes the acceleration of the process of including in law matters in which "there is not time for the development of non-jural sanctions of sufficient force and vitality to control the situation," and the corresponding tendency of many of these laws to become obsolete because social experience will soon demonstrate their worthlessness.

The next two articles show other efforts of the Bar to control this tendency to make new laws and to extend throughout the country and the world the experience of beneficial laws.

Judge Hargest (pp. 31–36) discusses the effort to make the laws harmonize throughout the United States. The action of forty-nine different jurisdictions in the United States adding their own interpretation to the existing multitude of laws would result in indescribable confusion for persons who have interests, business or otherwise, in the different states were there not some means of encouraging a certain amount of uniformity both in the text of laws and in their interpretation by the courts. This same idea is carried over into the international field by Mr. Goetz (pp. 37–47) only in this case the goal to be sought is international peace through better understanding. He is most encouraging in his outlook when he says that "the advancement made, while conservatively viewed as still in the inceptive stages, is nevertheless unprecedented in magnitude."

Finally Mr. Johnson (pp. 48–53), to conclude this part I, raises a warning finger pointing to the limitation which should be made in trying to solve all problems by law, but realizing that as a democracy we must "experiment if we legislate at all."

The effect of the section is to demonstrate the surging efforts of individuals and groups to make new laws, to change old laws and to control human relations

and human destinies more and more by law. At the same time we see equally impressive efforts on the part of lawyers and bar associations to understand this tremendous surge and direct it in effective channels so that it may serve and not swamp the community.

Part II brings us to the administrative side of the law. This is equally as important as the substantive law and it lends itself perhaps more readily to description to a lay audience.

The particular subject of Part II is in a sense introductory to the rest of the volume. It discusses the two outstanding resources of the administrative side of the law in solving human problems—conciliation and litigation. The first two articles both relate to conciliation. Judge Lauer (pp. 53–59) sees the need of it from the bench. Mr. Smith (pp. 60–65), speaking from years of experience in legal aid work sees it in connection with those controversies which may be disposed of by a legal aid society before they even reach the court room. The saving to the community in delay, expense and stored up anger by the greater use of conciliation is too striking to be overlooked. Judge Lauer says that conciliation supplies the remedy for the law's delay and at the same time encourages concord while litigation promotes discord among the parties. Mr. Smith illustrating the situation from the practice in Denmark urges that conciliation procedure be actually used and tried out by our judges.

The next three articles deal with the problems of making litigation less formidable. Mr. Grandfield (pp. 66–74) speaks on the subject of administrative law—the process whereby a particular type of problem is removed from the courts and turned over to a specialized tribunal which does nothing else. This manner of disposing of a case lies somewhat between the processes of conciliation and litigation. Judge Burr (pp. 75–81) discusses the vexing problem of trial by jury. This machinery, once won by the people from the king at the cost of untold suffering, has now to withstand serious attacks because it is regarded as no longer efficient. The remedies being applied to restore efficiency to this honored device make interesting reading.

Mr. Marvel (pp. 82–86) takes up the great question as to whether in our government of checks and balances the legislative branch has not intruded too much upon the territory of the judicial. He asks us to face frankly the situation of our courts handicapped by laws relating to procedure—the laws made by the legislature and the processes of the court not under the complete control of the judges.

In the final article in this section Mr. Harley (pp. 87–94) tells us of the efforts to meet the needs of administering law in urban centers by the establishment of courts to specialize in these problems. While Mr. Grandfield deals with this matter from the standpoint of the type of case to be handled by the tribunal, Mr. Harley is thinking of those matters which arise because of the nature of the community in which the court must operate.

Part II is a summary of ideas on conciliation, litigation and special legal machinery adapted to types of cases and types of communities. It gives an idea of the complexity of the problem of government by law from the administrative side. At the same time it shows the law and the legal profession grappling with the problem, striking out into new experiments and endeavoring to assure itself as to what is the next step for improvement in making the law work.

Part III deals with a further division of the administrative side of the law, and we are shown how in civil cases

there are great enterprises on foot for enabling the law to function more effectively.

Naturally the general subject of the trial of civil cases appears first. Mr. Shelton (pp. 95–101) summarizes adequately much that is going on in this direction. Here again we note the conflict between the legislative and judicial branches of government. He speaks of the congested dockets which "make necessary the use of arbitration courts or discourage men into surrendering their rights," and of "a combative dissatisfaction" with the machinery which would lessen popular faith in the courts were it not for the counter efforts being made to secure a remedy.

Judge Bruce (pp. 102–104) discusses the tendency to increase the equity jurisdiction of courts as a way out from some of the disadvantages of the slower time honored common law method. He raises the query as to whether the effort to get away from the cumbersome methods of trial may not result in an even greater use of equity as in the case of the Volstead Act which gains equity jurisdiction by the declaration that certain matters are declared nuisances which a court of equity may abate. Juvenile courts frequently combine equity and criminal jurisdiction.

Judge Day (pp. 105–111), from his practical experience on the bench, tells us about the operation of a family court. His viewpoint with regard to the usefulness of this machinery is well illustrated by the following quotation:

> A family court will not by its operation in a community end family disorganization, delinquency, divorce or any of the related problems, but it is a social and legal means whose aim is to rehabilitate the home. And perhaps the greatest service of all is to nullify or modify the social effects of the home that is broken beyond repair.

This article makes a graceful transition to the next part. Part IV represents a collection of interesting developments and contributions to the problem of making our criminal laws of more value both to the individual and to society at large. As one man has expressed it, "The modern criminal is either to be reformed by prison or else shut up for life and given such amenities as beer and tobacco to console him for loss of liberty. He used to be looked upon as possessed by the devil: Today he is regarded as an imperfectly constructed creature who cannot safely be left at large if his defects cannot be set right."[2]

This change in the attitude toward the criminal has made necessary enormous changes in the manner of dealing with him, and contributions have been sought and accepted from many groups and professions in addition to those which the law itself has inaugurated. It is impossible in the space allowed to cover the entire subject in detail. For this reason no particular mention is made of the specific work of crime commissions and legal aid societies as machinery for gathering statistics of persons accused of crime as a basis for a more intelligent method of handling the problems.

Dean Miller (pp. 112–118) introduces the topic by a well-rounded summary of the main points involved. The picture he gives us of "the trial judge" who has "become more and more an umpire, refereeing a skilfully coached game between contending lawyers and witnesses" serves to make concrete the difficulty of effecting a remedy.

Doctors McCarthy and Maeder tell of the contributions made by the medical profession on the matter of insanity and indicate further contributions which the medical profession is prepared to make. The recommendations of the authors in this regard deserve careful attention.

[2] "Lycurgus," by E. S. P. Haynes.

Contributions to the law may also be made by probation officers. Mr. Chute (pp. 136–141) describes the elements of probation work and its growth. He points out that it supplies the law with "a plan of social treatment and discipline applied by the court to such convicted offenders as the court after investigation believes may thus be adequately dealt with and prevented from further delinquency."

The legal profession is making contributions to the criminal law—among them being that of the defender organization in the city police courts described by Mr. Orfila (pp. 146–151).

One of the final steps in a criminal case is the appeal to the governor for clemency. Mr. Griffin (pp. 142–145) from a background of experience in dealing with the Baumes Commission in New York describes the factors which really induce a governor to pardon a criminal.

This section as to the criminal law is mainly a series of contributions made to it by allied professions which are concerned in solving similar problems.

Part V introduces us to the efforts being made by the legal profession itself to develop its own members to a degree of efficiency and strength of character necessary to ministers of justice and worthy of officers of the court. The subject naturally divides itself into those problems of training young men to become members of the profession—directing the energies of members of the profession—and eliminating undesirable members.

Mr. Reed (pp. 152–156) notes the difficult educational problem involved in keeping the profession truly representative and at the same time maintaining high standards of professional conduct. The divergencies among the admission requirements and among the law schools evidence the slow growth. The problem of bar associations at the present day is not so much the ideals of the associations as the membership. Mr. Guthrie (pp. 157–162) discusses the matter of bar associations in the United States as compared with an unorganized group of lawyers in upholding the standards of the profession. He concludes:

> There cannot permanently be great courts, whether national or state or local, without scholarly and competent bars ever determined through coöperation and collaboration in bar associations and law schools to contribute, in the full measure of their several abilities and opportunities, to the reform of our laws and their more efficient, impartial and just administration, and to the maintenance of the highest possible standards of professional service and ethics.

Mr. Gardiner (pp. 163–167) relates his experiences as secretary of a Grievance Committee which had to pass upon complaints brought against members of the Bar. His conclusion is that "most complaints are due to a lack of understanding on the part of complainants."

Part VI, closing the volume, brings out two of the efforts being made to secure more satisfactory laws from the legislature. Professor Leek (pp. 168–171) speaks of Legislative Reference Bureaus and Mr. Wismer (pp. 172–176) tells of the enormous fund of material in the files of legal aid societies.

Legislative reference bureaus gather quantities of information and do good technical jobs in drafting laws. But the contact between the law and the individual is nowhere so well represented as in the busy offices of the seventy-five or eighty legal aid societies of the United States today. The article by Mr. Wismer is practically the first ever to be written on the subject and is a fitting ending to the volume.

The editor of this volume desires to express his appreciation to the various gentlemen who contributed so generously of their time and effort in preparing these articles.

JOHN S. BRADWAY.

Social and Economic Problems of the Law

By Roscoe Pound
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LAW has always been confronted with social problems, and in a large sense has always been confronted with economic problems. The occasion for law is that we have to live together in civilized society under conditions in which claims and demands and desires conflict or overlap, and these claims or demands or desires must be adjusted or reconciled so as to bring about a maximum of satisfaction with a minimum of friction and waste, if civilization is to be maintained, furthered and handed on. The problems of law are social because the legal order is a social institution, a highly specialized form of social control. They are economic because the task of social control is one of governing human activities in the satisfaction of unlimited wants out of the limited stock of goods of existence so as to conserve those goods and make them, in a long view, go as far as possible.

Two circumstances have made us newly conscious of social and economic problems as problems of the law, and have made such problems seem peculiarly problems of the law in this time and place. One is that we are in a period of legal transition, in the wake of social and economic transition, following upon an era of legal and social and economic stability. In the era of a systematizing and ordering legal science, which went with this social and economic stability, we had come to think of the foundations of the law as fixed and of changes in law as no more than detailed new applications of old and settled principles. That mode of thought was a response to one set of social and economic problems. It is not sufficing for a new set newly pressing. Thus it is made to appear that such problems are something new. But a second circumstance, no less efficient toward the same result, is the break with the historical and analytical jurisprudence of the immediate past which is characteristic of recent legal thought. The historical and analytical jurisprudence of the last century sought to exclude all social and economic problems, as such, from the domain of the science of law. They sought to set up a self-sufficient jurisprudence in which only authoritative legal materials, regarded as such, should come into consideration. They expected to set up a critique of legal precepts, legal doctrines and legal institutions in terms of these precepts, doctrines and institutions themselves. A critique of them in terms of the social and economic problems to which they are addressed has drawn attention to something with which jurists had had no concern. It has made the relation of law to such problems seem something wholly new. It has made it seem that problems of the sort were confronting the law for the first time.

Although the functional thinking of today with its trying of legal precepts and doctrines and institutions with reference to how, and how far, they achieve the ends of law, make it look as if the legal order had to do with social and economic problems for the first time, in truth it is but meeting new social problems and new economic problems partly by adaptations and reshapings of the received traditional

legal materials and partly with new materials, new methods and new modes of juristic thought. The problems of the last century gathered round the security of acquisitions and the security of transactions. Hence they called for stabilizing theories, for strict setting off of authoritative legal materials from the extra-legal materials of legislative and judicial lawmaking, and for insistence on judicial rather than administrative justice and a holding down of the administrative element in judicial justice to the minimum. In contrast the problems of the present gather round the interest in the social life of the individual. Hence they call for a creative legal science. They call for scrutiny of the ideal element in law, something of which the legal science of the last century refused to take account. They call for recognition and definition of received ideals and a differentiation of those which are received and form part of the law from those which are extra-legal and personal to judge or magistrate or lawyer. They call for a critique of the received ideals in terms of the society of the time and its economic problems. They call for individualization in the application of law as distinctly as the problems of the last century called for generalized application and consideration of causes, as it were, in gross. Hence they call for recognition of the administrative element in all justice and not the least in judicial justice.

Economic unification is the conspicuous fact in America of today. The social and economic problems of our law are chiefly problems of adjusting human relations in the unified, machine-dominated, specialized, crowded life, under the eyes of one's fellow men, which goes on in the urban community of today, by means of the legal materials devised or given shape for the independent, individualist, diversified, relatively dispersed and self-determined life of the pioneer, rural, agricultural community of a century ago.

TYPES OF SOCIAL AND ECONOMIC ORDER

Compare, for a moment, the two types of social and economic order. A century ago life centered in small, clearly defined groups, the household and the neighborhood. Transportation was slow, inconvenient and expensive. Hence contacts with the outside were comparatively few. The groups in which men lived were economically independent. Each pioneer household, and to a great extent each rural household, raised its own food, butchered its own beef, killed its own hogs, smoked its hams and bacon, barreled its salt pork, cut fuel from its own wood lot, drew water from its own spring or its own well. Each housewife made the family clothes, spun wool and flax, made bread, churned butter, made soap and made candles. Each neighborhood ground its own grain, had its local carriage factory making its own vehicles, had its own tannery, and had its local cobblers making shoes for the neighbors. It was a self-sufficient economic entity. It had a large degree of political independence and was disposed to assert that independence to the utmost. A certain degree of political unification was required for purposes of protection, and the commerce clause of the federal constitution testifies to a rising need of some economic unification. But the provisions as to local militia in our bills of rights show how jealous these self-sufficient neighborhoods were of centralized military protection. They remind us how much those neighborhoods feared that the central protecting authority might get out of hand and impose its authority beyond what was required for the common defence against alien enemies.

Nor was there specialization in the pioneer, rural community. Individual versatility was the rule and was carried to the extreme. Each household, or at least each neighborhood, had to find within itself those equal to every emergency, those competent to do anything demanded for the existence and the functioning of the group. Above all, moreover, each group was a free group. Each grown individual, and the pioneer matured early, was free to withdraw and seek more congenial associations, physical or human. Any one who chafed under the small degree of social control required for the pioneer, rural community could turn into the wilderness and make him a new home.

In a society so organized the whole spirit of the law, its ideals as well as its precepts and doctrines and institutions, made for a maximum of individual self-assertion, a maximum of local independence, a maximum diffusion of responsibility and a régime of individual free action, judged after the event by preappointed standards, not one of administrative guidance in advance of the crisis of action in order to obviate doubts and disputes. In such a society the doctrine of consociation rather than subordination, the conception that we are with one another rather than over one another, the régime of every one looking out for himself, expressed the civilization of the time and place as completely as they fail to express the civilization of today.

POLITICAL AND ECONOMIC CHANGES

Today we live not so much in households and neighborhoods and more in an indefinite nation-wide interdependence. If we live in some part in groups, the groups are looser, less definite, and larger. The household is a loose group. Household discipline is less relied upon as an agency of social control. For example, truancy and incorrigibility are no longer a mere matter for interview between father and son, but are in the jurisdiction of juvenile courts. A generation ago it was settled that the husband's common-law right of correction was obsolete. Long ago it became the American doctrine that husband and wife might have separate domiciles. Today they may have diverse national characters. What is more significant, the household has ceased to be an economic unit even in legal theory, and legal theory is always the last thing to change. Laws as to child labor, juvenile courts, domestic relations courts, newer doctrines as to the claims of husband and wife and parent and child, have made the legal rights to services of wife and child little more than fictions on which to ground certain actions. Moreover, the books now discuss, not defence of a member of one's household, but defence of a guest riding in his automobile. Both the neighborhood and the politically defined locality have ceased to be definite self-sufficient groups. Dwellers in the same urban apartment house often no longer know each other or have any interests in common, unless sometimes to hold a miserly landlord to the minimum of fair treatment which they can extort from him with the aid of a housing commission. Local neighborhoods have ceased to be self-sufficient or self-sustaining. For example, in the agricultural community in Maine in which I live in the summer you buy at the country store corned beef canned in Argentina by a Chicago corporation, ham and bacon come from Chicago, and milk is shipped to Boston. For clothing one orders from mail order houses in New York or Philadelphia, remits through the post-office, and receives his purchase through the parcel post. Bread is made in another state and comes to a local distributer by express. In the urban community

which is my political and legal situs, fuel comes from Pennsylvania if coal, or Texas if oil, and we are at the mercy of labor troubles in jurisdictions in which our interests do not come into consideration. Our water supply comes from interstate streams and interstate complications with respect to it have arisen more than once. Ice comes from another state. We do not grow our own grain, make our own vehicles, or even raise our own fruit and vegetables within the territory of which politically we are a part. The local cobbler has ceased to be more than a repairer of shoes. The local mill and the local tannery have gone. The local carriage factory has gone. Vehicles are made in a few specialized industrial centers, and sales agents throughout the country have replaced the local carriage factory. Even crimes and criminals have ceased to be necessarily domestic. Country-wide organization of crime has become as feasible and inevitable as country-wide organization of industry.

Where the political group in the past was homogeneous and natural, today it is likely to be heterogeneous and from an economic standpoint artificial. Compare the colony of the revolutionary period with the state of today. Especially in the west the state boundaries are often but arbitrary lines upon the map. One portion of a political unit may be tributary economically to a center in one state and another to a different center in a third state, or the whole may be dependent upon some great center out of the state. The vital interests of the individual are no longer necessarily in the politically defined geographical area in which he chances to sleep nights. His working life may be in Manhattan and yet our political organization may assign him to New Jersey or Connecticut. The sales agent politically in California may be economically dependent upon Detroit or Flint in Michigan. Thus we may understand why politics mean much less to the city dweller of today than they meant to the pioneer. To the pioneer they involved a paramount interest in protection. To the city dweller of today they have no direct relation to his most immediate and vital interests.

Whereas one hundred years ago the farmer took his grain to a local miller and his vegetables to a local market, today a large part of the grain which he raises goes abroad, and one may see on a spur track in California freight cars loading with lettuce for the tables in New York and Boston. Whereas a century ago the local store played no mean part in neighborhood life, today we have chain stores. In place of the local inn we have chain hotels, very likely with a peripatetic staff, working as like as not in New England in the summer, and in Florida in the winter. Modern transportation has unified not only our economic life, but even our recreations. The radio furnishes a common program for great areas extending beyond political boundaries. Spring and summer see an annual migration in automobiles so that New England may be the summer playground and Florida the winter playground of a whole people. Thus state lines lose any but political significance.

American law was formative at a time when it took Washington twelve days to ride from Philadelphia to Cambridge in an emergency. Today any traveler can make that journey in eight hours. Our legal institutions belong to an era when General Grant took nine days to travel by river boat, canal and rail from Ohio to West Point. Today he could travel by rail from Los Angeles to West Point in half of that time. They are conceived in the spirit of the time when General Sherman, go-

ing from New Orleans to San Francisco by the quickest route, spent six weeks in a journey which one may make today in less than half as many days. Indeed men have gone from New York to San Francisco by automobile in half the time, and New York and Boston are but two days from San Francisco and Los Angeles by air mail. In short, transportation and communication have made of the land one vast overgrown heterogeneous community, but our legal institutions speak from the time of small self-sufficient homogeneous local communities.

LEGAL SYSTEM CHARACTERISTICS

What these things mean may be understood better if we look at some characteristics of our legal system in their relation to the past and the present.

In receiving and giving shape to English legal materials and legal institutions to meet the needs of a pioneer, rural, agricultural society, characteristically we developed detailed bodies of local law. As one might say, our common law has been a law for Main Street. It has been a law for a society of local communities, each as free as was consistent with the general defence, and each left to itself as far as possible. The Latin world inherited from the Roman Empire ideas of unity and centralization. England preserved, and even developed, the Germanic tendency to small autonomous groups, which is so marked in Protestantism in contrast with the universal organization of Latin Christianity. This tendency has been strong in American common-law institutions. The characteristic Anglo-American legal polity has a background of historical unity and a foreground of individualized local detail.

This polity did well in the society of independent, local neighborhoods of early nineteenth-century America. It is strained to the breaking point in the economically unified society of interdependent communities which obtains today. Uniform legislation on commercial subjects has been going on for a generation. In spite of our inherited distrust of central authority, and concern for local autonomy, we seem to be pushed by the exigencies of our economic unification toward more and more federal control of what we cannot but feel is the business of the local government. We are driven to learn coöperation as the alternative of a justly dreaded centralization; and coöperation between governmental agencies has always been the weak point of a polity organized round ideas of diffusion rather than concentration of power, of checks and balances, and of accountability to courts rather than to administrative superiors. The local provincialism of our law must give way before conditions in which the everyday transactions of our economic life habitually transcend state lines.

Another characteristic no less marked is the doctrine of supremacy of the law and its corollary, aversion to administration as contrasted with adjudication. The common-law polity seeks to make of everything a legal question, and that means a judicial question. Morley tells us that this is in some measure attributable to Puritanism, but it runs back to the Middle Ages and has been a mark of the common law since the thirteenth century. It goes back to the spirit of Germanic law which thought of the King as ruling under God and the law, and sought to subject all exercise of the will to an order of justice over and above human control. In our formative polity these ideas were organized by the doctrine of separation of powers. Thus subjection of all things to judicial control, invoked in the process of orderly litigation, became the presupposition of our con-

stitutional law. Great questions of legislative policy are left ultimately to the courts for adjudication as to whether there is due process of law, while statutes involving the most vital concerns of life remain in a state of suspense nominally in force but subject to judicial scrutiny at some indefinite time in the future. Administration in matters of the gravest concern is carried on by means of injunctions. But the other day we saw the question how far a legislature might convene and impeach a governor determined by the same court which tries everyday actions at law and suits in equity. Today one of our states is suing another in the highest court of the land in order that an administrative adjustment of rights in a river may be reached judicially. The use of the waters of a great lake by the second largest of our metropolitan areas, as against the claims of other great urban areas with respect to harbors and waterways, is made the subject, not of legislative or of administrative arrangement but of a suit in equity. We have seen open and persistent attack upon this feature of our common law polity in agitation for recall of judges, recall of judicial decisions, and limitation of judicial power over unconstitutional legislation. It is not unlikely that such attacks presently will be repeated. But these attacks are less significant than the rise of delegated legislation, the shifting of the leadership in political life from legislatures and courts to the executive, the setting up of administrative commissions with mixed powers, and the steady growth of boards and commissions with jurisdiction over what were once taken to be matters of judicial cognizance. It is vain to lament these phenomena. A need of getting things done in a country of quick and far-reaching transportation, far ramifying interdependence, restless business enterprise, and nation-wide undertakings calling for instant determinations of policy and speedy execution, preclude application of the deliberate methods of judicial determination after the event to the conduct of everyday business. We can no more govern the business life of today by the judicial methods of the last century than we can control the motor traffic in our city streets by the same rule of the road and standard of the reasonable man applied judicially after the accident, which sufficed for the buggies and lumber wagons of a generation ago.

ADMINISTRATION OF JUSTICE THROUGH TRIAL BY JURY

A third characteristic of our American common law has been popular participation in the administration of justice through trial by jury. This common-law institution had an extreme development in the United States. It appealed to pioneer versatility, to the pioneer feeling that any man was competent to do anything. Hence we conferred greater powers upon juries than they ever had in England, and left them much more free from judicial control than they had been in any other English-speaking land. No doubt this wide popular participation in the administration of justice, and consequent popular responsibility for the practical working of the machinery of justice, was beneficial in pioneer rural, agricultural America. The cases heard by juries arose in the neighborhood and called for local knowledge and a shrewd judgment of the juror's neighbors and their dealings and conduct. But the city dweller of today has no such neighborhood knowledge as the common-law jury presupposes. His experience is likely to be limited to his office or shop or desk and the daily journey to and from his cell in an apart-

ment house. For the rest it is a specialized experience, very likely in some nation-wide business, but extending only to some particular phase of that business. From this narrow environment he is called on as a juror to deal with cases out of his experience and out of the confined orbit of his life. He is called on to deal with cases involving country-wide transactions, or involving details which only a specialist may thoroughly understand. Moreover, the congested dockets of the courts, the long or even continuous sittings of trial courts in our cities, and the large panels called for by causes of public interest, have made jury trial a serious economic drain for which the civil jury of today is felt by the business community to offer little compensating advantage. Accordingly, subject after subject has been taken away from the courts and confided to administrative boards, largely in order to avoid the delay and expense and uncertainty of jury trial. The proved inapplicability of jury trial to commercial causes has led to a new growth of arbitration, with legislation in every part of the land extending its scope and powerful organizations of business men urging it in new directions. Constitutional amendments in a growing number of jurisdictions admit of verdicts by less than the whole number of jurors. Powers of reviewing the verdicts of juries are being conferred upon courts in some of our most conservative states, and courts everywhere are assuming such powers without legislation. This is in marked contrast with the legislation of the past and the judicial attitude of the formative era of our polity. No one who studies attentively American legislation and judicial decision of today can doubt that our economic unification and specialization is having a profound effect upon the system of trial by jury in civil causes.

AVERSION TO LEGISLATION

Another characteristic of our common law is its aversion to legislation, its reliance upon judicial empiricism rather than upon texts formulated in advance. But in the economic order of today the need of knowing in advance the details of what may be done and what is prohibited compels resort to legislation whether we like it or not. We cannot expect greatly to diminish, much less to abate, legislative lawmaking activity.

Above all and in a sense summing up the foregoing characteristics, our common law is and has always been intensely individualist. But when we look at our common-law individualism in the light of the social order as it now is, we must recognize that adjustment of this traditional spirit of our law to a different organization of society is not the least of the problems of the legal order. In a pioneer society the freely self-determining individual unit was a reality. In a society marked by extreme specialization, minute division of labor, and far-reaching economic interdependence, our nineteenth-century ideal of the individual is out of relation to the facts. Our forefathers valued and safeguarded the individual independence and individual initiative without which a social order in the wilderness would have been impossible. We have to learn instead to value and safeguard coöperation, the initiative of the competent specialist, and subjection to rule, without which an urban, industrial social order is no less impossible. We must find how to adjust the classical formulations of common-law individualism in our Bills of Rights to the needs of twentieth-century life. How to do this is not the least task of the lawyer of the immediate future, and that task will not be the easier in that it involves new modes of thought

in comparison with the common-law ideas in which lawyers have been trained.

What is needed, then, is not to enumerate the social and economic problems of the day as simply so many tasks for legislative lawmaking. We need instead to appraise our traditional legal materials with respect to these problems, to see wherein those materials are ill adapted to their new tasks, to see why it is that new precepts devised expressly to meet these problems so frequently fall short of the effects expected of them, and to see how our authoritative materials, old and new, may be made more responsive to the demands upon them. We need to see how the operation of newly enacted or newly discovered precepts or doctrines or institutions may be furthered rather than hindered or defeated by the traditional technique of common-law judges and lawyers, and how such precepts and doctrines and institutions may find effective place in the legal system as a whole.

I venture to think that we shall find the key to these problems in that better understanding of the elements of a system of law which has come with modern legal science. In recognizing the importance of ideals of law, jurists have become conscious that law is more than an aggregate of rules. They have been coming to see that a traditional or authoritative technique of developing and applying legal materials, and a body of received ideals of the end of law, and of what legal precepts should be in view thereof, are elements of the legal system no less than the authoritative precepts, and are more enduring and more decisive for the administration of justice. The traditional technique is the most characteristic element in any system of law. It is this element which gives unity to the law of our forty-eight states, which unifies the laws of England and Canada and America and Australia, which binds the law of today to that of Blackstone's time, to the classical common law of Elizabeth and James I, and even to the law of medieval England. It is this element which differentiates the legal system of English-speaking countries from the system which obtains in the rest of the world by derivation from Rome. It is his possession of this technique which makes it possible for the lawyer to effect results with what otherwise would be a bewildering mass of legal precepts. It is his ignorance of this technique, and his lack of appreciation of its rôle as an element in law, which, as a rule, makes the efforts of the lay law reformer so futile in action. But our nineteenth-century theory of law ignored this element, and it is not unnatural that its proper and inevitable operations are branded by the layman as judicial usurpation or as technical quibbles of the lawyer.

It is because the legislator has his eye exclusively on detailed legal precepts and takes them for the whole law that he so often fails in his well-meant endeavors to make laws. In the application of the precepts which he has devised so ingeniously and formulated so carefully, some things constantly come into the result which his calculations had left out of account. Trained in a theory of law which also leaves them out of account, he is not unlikely to assume that dishonest or inefficient officials, or a bad machinery of justice, or inherent bad tendencies in the legal profession, or a decadence of the morale of the people, or all these things, are chargeable with the miscarriage. It is more than likely that the intruding and disturbing element is the law itself, into which his legal precept did not fit and to which it has had to be adjusted.

DECISIVE FACTOR IN ADAPTATION

But the decisive factor in adapting our legal materials to the social and

economic problems of the legal order of today will be found in the received ideals of the legal profession which are the background of decision of causes, of interpretation of precepts, of application of precepts and of development of principles. These ideals give the pattern to which authoritative precepts are shaped in the process of judicial decision and juristic theorizing.

We deceive ourselves grossly when we devise theories of law or theories of judicial decision which exclude such things from "the law." When such ideal pictures have acquired a certain fixity in the judicial and professional tradition, they are part of "the law" quite as much as legal precepts. They give the latter their living content, and in all difficult cases are the ultimate basis of choosing starting points for judicial reasoning, of selecting analogies to be developed, of giving definite form to principles, and thus, in the end, to the decision of controversies. When we seek to exclude them from our formal conception of law we not only attempt to exclude phenomena of the highest significance for the understanding of the actual functioning of judicial justice, but, as things are, we do the courts much wrong by laying them open to a charge of deciding lawlessly when they do what they must do, and what courts have always been compelled to do, in administering justice according to law.

It is futile to seek to conceal the vital rôle of ideals in the actual work of the tribunals. To insist upon a theory which ignores them invites ignorant attacks upon the courts, and must in the end impair lay confidence in our judicial institutions much more than frank recognition of the facts and endeavor to give a scientific account of them. For courts and jurists have always proceeded on the basis of something more than a formal body of authoritative legal precepts for the time being. Even the analytical jurist, whose boast is that he goes wholly and exclusively upon the actual rules which in fact obtain in the courts of modern states, in practice imports into his science an ideal logical pattern of what those rules should be which determines all his results.

Our ultimate reliance must be upon education of judge and lawmaker and administrator, on an education which will subject the received ideals to critical scrutiny, will give them definite outline, will try both outline and content by the purposes of the legal order, and will set off the subjective ideals of judge and jurist from those which have been accepted by the legal order and have become a part of the law. Instead of assuming these ideals, uncriticized, ill defined, and unconsciously employed, the demands both of progress and of stability call for a recognition of their controlling, and legitimately controlling rôle, organization of them as our legal science has so well organized the precept element of the law, and the critical definition and intelligent employment of them which only scientific study and conscious training can bring about. Until these things have been achieved in some measure our huge biennial output of legislature-made precepts, and the swelling chorus of public complaint at the volume and ineffectiveness of those precepts, are not likely to abate.

The Work of the American Law Institute

By HERBERT F. GOODRICH
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LORD CHIEF JUSTICE REEVE, of the English Court of Common Pleas, in 1791 wrote to his nephew, who was about to begin the study of law. He referred the young man to a list of fourteen law books, several of them intended as reference works only. These being examined, the student was directed "to give diligent attendance on the courts at Westminster, and to begin orderly reading the several reports, which must be read and commonplaced in such manner as . . . you will be able to advise yourself." The study of law in 1791, although lawyers and judges even then complained of the burdensome amount of recorded learning, was a simple matter. In Lincoln's time in our own country there were not half a dozen law libraries in Chicago that could boast a hundred volumes. Lincoln and his partner had a "superior" library—their Illinois reports and twenty or thirty volumes of various law books, legislative reports and congressional documents.

THE PRESENT CONFUSION IN THE LAW

A few short decades have made an enormous change. The library of the practicing lawyer runs into thousands of volumes; that of a local bar association may run into the tens of thousands. The reports of cases decided by the court of last resort in Illinois now number 325 volumes, Pennsylvania 288, New York 244, Massachusetts 255, Michigan 236. The last volume of the reports of the United States Supreme Court numbers 270. Decisions from the various appellate courts in this country whose opinions are printed now number about 30,000 a year. This does not mean that people in the United States start or try 30,000 law suits a year; it means that of the total tried there have been appeals, briefs, arguments and decisions by higher courts in this tremendous number. A lawyer would not have time to go through the physical labor of reading all this mass of material as it appeared if he devoted all his working hours to the undertaking. Much less could he examine it critically to see what it was all about. Each year the volume increases.

But this mass of reported decisions cannot be disregarded by the lawyer. To advise a client of his rights or liabilities, he must know what courts have said in other cases where the facts were similar to the one the client presents to him. To know what the courts have said, the lawyer must have access to the books in which the decisions of cases are reported. This expense of acquiring and keeping up the sets of reports is very great. Again, even with the help of indices and skillfully constructed digests, the time involved in looking up the law on a given point accumulates with startling rapidity. Yet the time must be devoted to the task; it is no longer safe to give a legal opinion, as in pioneer days, "by the grace of God and the light of pure reason." Furthermore, the lawyer's time must be paid for. He cannot do his work for nothing if he is to make a living. It is not only the large and important cases, either, that present

hard problems; many small transactions bristle with legal difficulties covering a wide range.

The worst of it is that even when the lawyer has bought his large library of expensive law books, and spent many hours in looking up legal authorities on his client's problem, he may not be able to give advice with any feeling of certainty that the court in his own state will uphold him. Perhaps his question may never have come before the Supreme Court of his own state, but a dozen courts in neighboring states may have pronounced on it. Perhaps those courts have divided in their view as to the settlement of the question; a majority of them may have decided one way, but a respectable minority announced a different opinion and supported it by what seems to the lawyer many convincing reasons for the result. It may well be, as it is in many places in the law, that either rule would work well enough if the rule could be authoritatively settled. But in the meantime the lawyer can only give a guess as to what his own court will say, and neither he nor the client can know whether the guess is right until a long and expensive litigation is concluded. If what the client wants is guidance for future conduct, not help from a present predicament, his adviser must send him away empty-handed.

Because of our federal system of government in this country we have no one court which has authority to settle, once for all, the rule which shall stand as the law in all the states of the Union. The United States Supreme Court has final authority on matters involving the Constitution or laws of the United States, and the states must obey. It is the final arbiter in determining whether a state tax statute unlawfully burdens commerce among the states, or whether a man's life, liberty or property have been taken from him by a state without due process of law. But our federal Supreme Court has no authority to lay down a rule on general matters for the whole country which the states must follow. Such questions as the duty of the driver of an automobile to his gratuitously carried guest, how long an offer to sell certain goods remains open for acceptance, whether an agent has power to subject his employer to liability by signing a note, are not reviewable by federal authority when once settled by the highest court of a state.

FORMATION OF AMERICAN LAW INSTITUTE

It was from this confusion of tongues that the idea of the American Law Institute developed. A group of thoughtful lawyers asked themselves: Is there not some way which can be devised to relieve the law of some of its growing complexity and uncertainty? Cannot the judges on the bench, the practitioners at the bar, and the law schools and their faculties together work out a solution of the problem? It was with this idea in mind that the organization meeting of the American Law Institute was held in Washington on February 23, 1923. Those present heard and considered the report of a committee which bore the formidable title of "The Committee on the Establishment of a Permanent Organization for the Improvement of the Law Proposing the Establishment of an American Law Institute." The committee was composed of distinguished lawyers; its report was made to a body of lawyers and judges of equal eminence. The American Law Institute was thereupon organized. Its declared purposes, as stated in its articles of incorporation are: "To promote the clarification and simplification of the law and its better adaptation to social needs, to secure the better administra-

tion of justice, and to encourage and carry on scholarly and scientific legal work." Its honorary president from the beginning has been Mr. Elihu Root, whose judgment, counsel and enthusiasm have been of invaluable assistance. Its other officers, Mr. George W. Wickersham of New York, the president, Honorable Benjamin N. Cardozo, Chief Judge of the New York Court of Appeals, the vice-president, and Mr. George W. Murray, the treasurer, have, since the formation of the Institute, given unselfishly of their time and effort to further the work. Mr. William Draper Lewis, formerly Dean of the Law School of the University of Pennsylvania, has been the able Director of the Institute since the work started. He now gives his entire time to its various activities. The governing body of the Institute, its council and also its membership have uniformly been composed of lawyers of high standing. They have been chosen from men in active practice, judicial positions, and the faculties of the law schools of the universities.

THE RESTATEMENT OF THE COMMON LAW

The kind of work the Institute is doing has always been clear to that body, but has not always been understood generally. The Institute does not propose to reduce the various branches of the law to a form of statement suitable for enactment into statute, and to recommend to legislatures for passage. Such work has already been done for more than a quarter of a century in this country by a very able body known as the National Conference of Commissioners on Uniform State Laws. That body has drafted statutes upon subjects such as negotiable instruments, sales of personal property, transfers of corporate stock, and has done its work very well. Uniform statutes upon these and other important matters are now to be found upon the books of many of our states. The Institute is in no sense competing with this Conference, nor is it covering the same field. It has made but one excursion into the realm of statute drafting. The criminal procedure in the United States has been the subject of so much discussion and criticism both in and out of the legal profession that it was thought proper to make a study of the various statutes upon the subject and to draw up what might be called a model code of criminal procedure, in a form which could be adopted by a legislature. The committee on this subject is now at work. But the main undertaking of the Institute is, to borrow Mr. Wickersham's language, "to restate in clear intelligent form the existing common or unwritten law upon such topics as from time to time may be taken up for restudy and restatement." The body has neither official position nor governmental backing. It is a voluntary association of men interested in the law, seeking its improvement. Its ambition is that, through the careful and painstaking work of the Institute and its committees, there can be made such a clear and accurate statement of the rules of the common law that lawyers and judges can accept this statement as "the law," without having to work back through the myriad of precedents and dicta upon which the statement is based. The accomplishment of this fine vision will be a critical test of American legal scholarship.

Funds for the carrying on of this great research project, necessitating, as it does, an enormous amount of examination of law books, meetings of legal experts, and publication of the material, have been provided through the generosity of the Carnegie Corporation. This gift is sufficient to support the

work, at its present rate, for a period of ten years.

THE METHOD OF WORK

The law covers too wide a field to undertake a restatement of all of it at one time. Further, some of its conventional divisions, like that concerning negotiable paper or the sales of personal property, have become so largely statutory that restatement of the common law upon the subject is not urgently required. So a beginning was made by choosing a few subjects to work upon. Conflict of Laws, Contracts, Agency and Torts were selected.

The work of restatement is entrusted to a lawyer called the Reporter. In Conflict of Laws, the Reporter is Professor Joseph H. Beale of the Harvard Law School; in Contracts, Professor Samuel Williston of the same school; in Agency, Professor Floyd R. Mechem of the University of Chicago Law School; in Torts, Professor Francis H. Bohlen of Harvard, formerly of the Law School of the University of Pennsylvania. These men, and the others chosen for similar positions since, have lived with these various subjects for many years. They have taught it to law students; they have written books and articles on its various problems; they have been counsel in litigation involving questions in their special fields. They begin this work with the Institute as experts in their respective branches of the law. They are provided with assistants who help in examination of all relevant material, reports of cases, legal essays, and textbooks in the particular branch of law.

The Reporter, having made a tentative outline of his subject, reëxamines the source material of a subdivision of it and makes a draft of what he considers to be the correct rules of law therein. When in form and substance it appears satisfactory to him, he submits it to a group of Advisers. They are men also chosen for knowledge and experience in that particular field of law; some from the practice, some from the bench, some from the law schools. The Director, the Reporter and the Advisers, having studied the material, meet and talk it over. Differences of opinion develop over both the substantive law and the form in which the statements are made. If the rule under debate is one where courts have differed in opinion the merits of each side are fully discussed. One view or the other is chosen as the consensus of opinion. Reasons why the view chosen is considered preferable are set forth in a statement to be presented to the general meeting of the Institute. A forty-page pamphlet of material is covered and debated with difficulty in a session lasting three or four full days. Generally three, sometimes four such meetings on the same material are required to prepare it satisfactorily for submission to the Council. In the Council the tentative Restatement is again examined and again discussed. Finally it is submitted to the membership of the Institute for discussion at its annual meeting. Here, too, it is only tentative, still open to criticism, and suggestions for improvement. Many such suggestions are received and many improvements are made.

If this heroic process does not produce a carefully prepared, sound and accurate statement of the common law, it is hardly possible to see how one can be made. The work starts in the hands of one already an expert in his field, and is subjected throughout to close scrutiny by those hardly less expert than he. There is no effort to rush the thing through; each problem is carefully considered.

The form of the Restatement is perhaps novel to the profession. It is not designed for light reading, nor as a treatise to make every man his own lawyer. The statement of the princi-

ple of law appears as a rule in black letter text. This is followed by comment explaining the application of the rule. Illustration follows, when deemed necessary, to show the application of the rule to a concrete set of facts. Following is a sample section, taken at random from the most recently completed portion of the Restatement of Conflict of Laws. It is from the chapter dealing with Corporations.

Section 173. Unless forbidden by statute, a foreign corporation may acquire, hold, and dispose of real and personal property situated in the state.

Comment:

(a) The acquisition, holding, and disposition of property is governed by the law of the state where it is situated (see Sections 00). That state may by statute limit or altogether deny the power of a foreign corporation to hold real or personal property. There is no such limitation at common law.

Illustrations:

(a) A deed of land in state Y is made to the A Trust Company, a corporation of state X, in trust for B. The validity of the conveyance and the rights of the parties under it are settled by the law of state Y.

(b) A is a charitable corporation of state X, with power to buy, own, and sell land. The statutes of state Y have no express provision as to the holding of real estate by charitable corporations. A will be permitted to hold land in Y.

The work has progressed steadily since the formation of the Institute in 1923. Some of the subjects are well along toward completion. In all of them substantial progress has been made. Work has begun in additional subjects. Property is to be stated under the direction of Professor Harry A. Bigelow of the University of Chicago Law School. Professor Austin W. Scott of Harvard has undertaken a statement of the Law of Trusts. The Director is working on the law of Business Associations. New work will be undertaken as time goes on.

An interesting test to make of the Institute's Restatement is to take a portion of it in any subject and compare the rules of law as there stated with the decisions of one individual state on the same points. As might be expected, they run very closely together. There is this difference; the Restatement is logically stated and developed with great care; a body of decisions is necessarily a patchwork. Problems do not come before courts in logical order, but hit or miss, as cases of individual litigants which the judges must decide. And the value of an opinion expressing a court's decision varies with the ability of the particular judge who writes it. In the instances where comparison has been made, decision and restatement ran very close together. Only now and then a variation appeared. One variation alone makes no substantial difference. Twenty slight departures from general rules by one court appreciably affects that state's law. Multiply the twenty by the number of courts in our country, and no further demonstration is required of the great need for some authoritative statement of the law that courts can follow. This is what the Institute hopes to do.

Prospects are very encouraging for a large measure of success in the realization of these hopes. That the work is being thoroughly and carefully done there is no doubt. Though all the Restatements are still in tentative form, they have already been cited by high courts as correctly stating the law. The profession is greatly interested, and is giving the work its hearty support. For the future there must be the exercise of the same careful scrutiny over the work remaining as has been exercised over that already done. It is equally essential that all the lawyers the country over are kept in touch with the progress of restating the law.

Changes in the Law of the Family, Persons and Property

By J. P. CHAMBERLAIN
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THE culmination of a definite change which has come about in the mores of our people in respect to the position of the woman in the family, is mirrored in the legislation and the judicial decisions of the last ten years. The lawmaker, at the State Capitol and in the Courthouse, has played his appropriate rôle, following rather than leading in the formation of the new folkway, and the hesitating steps taken even in the twentieth century testify to the reluctance of a strong and vigorous group to accept it as definite. By hesitating steps throughout the nineteenth century, accelerated in the twentieth, has the social transformation come about, and the legal transformation mirrors in its halting progress as in its goal, the social movement from which it results.

Of the two organs for the expression in legal rule of the customs of society, the courts and the legislatures, the latter has been by far the more important in registering the changes in custom in this field. The importance of statute law as against that of court decision as indicating the trend of the popular will, as well as evidencing the wishes of organized groups, is very marked. Great reforms in the law do not depend on debates before black-gowned judges under restricting rules of evidence and court procedure, where individual rights confuse the issue of the public interest and the whole system of the presentation of the case militates against a fair presentation of the facts on which are based the public interest or the conflicting interests of organized or unorganized groups. Through the press and public platform, campaigns of education can be carried on to impress on the popular mind the issues involved in a particular reform. Through hearings before a legislative committee, the facts, social as well as legal, can be fully presented not by counsel for individuals, but by the advisers of the groups which represent the real interests concerned; the body, on whom rests the responsibility of assuring the public interest and preventing from being adopted unwise rules or rules which are directly counter to the prevailing mores, the legislature, is more sensitive to public opinion, has more ways of finding out the degree of public approval than the small group of men sitting on the bench of a law court.[1]

Not only in the political but in the economic and social fields where the common law was supreme, is this true. It is the legislature which has originated the rules declaratory of the changing mores, followed, often reluctantly, by the judges who are not always sensitive to the new ideas which are modifying the customs of society. Not infrequently, the Great and General Court of the State,[2] the legislature, must on appeal reverse the decision of the judicial court because the social reasons given by the judges do not hold before that tribunal in which

[1] "Legislative Contributions to Progress," T. I. Parkinson, *Am. Bar Assoc. Journal*, Feb., 1926, Vol. XII, p. 95.

[2] Constitution of Massachusetts, Ch. 1, Sec. 1.

popular opinion is directly represented. A striking case of this tendency occurred in Wisconsin, where the legislature in 1881 passed an act giving the wife a right to bring suit in her own name for injuries to her person or property. A woman sued under the statute for alienation of her husband's affections. The court denied that the legislature had intended so drastic a blow to the sacredness of the home as to recognize in the wife the same right to the affection and society of her husband as he had to hers. The positions of man and wife in this respect, said the court, are "radically different," and to allow the wife to bring such action would result in numberless suits and the breaking up of homes.[3] But the court could not long stem the current of the social will for sex equality which, acting through the legislatures in 1905, swept away the wall of defense which the judges had tried to erect in its path. Chapter 17 of the Acts of that year expressly granted to the wife the right which the court considered so fatal to the social structure. Commenting on the legislative judgment as against that of the court, a later judge remarked that no flood of suits resulted from the statute nor did the institution of the family in Wisconsin seem in danger. "It is only when the ideal family relation for some reason has been disrupted that rights under the statute are asserted."[4] In this instance, the error of the court in evaluating social facts might have been overruled by a persistent effort which would have brought about a reversal of its opinion by the court itself, and thus a change in the law, but the cost and delay of so clumsy a method of establishing in law a custom already prevailing in society, as against the greater definiteness and speed of legislative enactment, make it evident why the way of the statute was chosen.[5] This brief sketch of the changes in the law will therefore principally be illustrated by statutes.

[3] *Duffies* v. *Duffies* (1890), 76 Wis. 374.

[4] *Wait* v. *Pierce*, 191 Wis. 202, p. 211.

THE INDIVIDUAL AND THE FAMILY UNIT

In that branch of the law which deals with the family, inheritance and persons, two principles have been contending for expression. The theory of the independence of the individual in the modern form which would exalt the individuality of the married woman in her personal as in her property relations is not easy to reconcile with the ancient theory of the unit of the family and her place as a subordinate member of the group dominated by the husband and father. Under the common law, "marriage imposes on the wife a general disability to act or contract as she could have done prior to her coverture, her legal existence being merged in that of her husband."[6] This legal custom is so clearly in contradistinction to the social custom that it could not stand and "the tendency of modern legislation has been to remove the incapacity of the wife to a greater or less extent."[7]

However, the economic status of the

[5] I have no space here to go into the various reasons for the superiority of the legislature over the court as an organ of fundamental legal reform in family relations; the argument that the position of the courts is essentially static as against the legislature as dynamic is not a consequence of the judicial function, witness the recent decisions adapting the law to business relations, Lord Mansfield's great statement of the commercial law of England in the eighteenth century and the liberalization of the feudal land law by the king's judges in the face of the Statute of Uses vainly set up by Parliament. Much modern change in the law requires an adjustment by the legislature of administration and detail either by the statute or through administrative rulings, but the reason given in the text seems in such cases the most important.

[6] *Corpus Juris*, Vol. 30, p. 716.

[7] *Ibid.*

woman has not developed far enough to change the folkway which puts on the man, primarily, the duty of family support. The man is normally the economic head of the family, the wage earner, and the mores of today demand that his responsibility to support his wife and children be maintained. This social fact has a repercussion in the Workmen's Compensation Law. It is assumed that a man's wife, who was living with him at the time of his death, was being supported out of his wages and would continue to share in his weekly pay check. His death, therefore, is her injury and, in her own right, she received a fixed percentage of his former wages or salary in addition to a payment for the children, so that the family is maintained. If she marries again, becomes part of a family group supported by another man, her compensation ceases. This rule involved no change from the old common law principle, except in the method of administration; it shows the continuation of the old economic status in the family. Furthermore, the compensation laws allow payment to a husband in case of the death of his wife only if he was himself unable to work and was dependent on her for support at the time of her death. Again the old principle in the new form. The husband is bound to support the wife, the wife is bound only to support the husband if he is incapable of carrying his duty of caring for his family. The principle of equality, on the other hand, is consecrated by the model Small Loans Act so freely adopted by the states. That law recognizes a degree of community in the earnings of husband and wife. Neither may validly assign wages earned or to be earned, without the signature in person of the other.[8]

[8] R. I., Ch. 427, 1923, Michigan No. 228, Oregon 219, Texas 28.

This enactment does not affect the primary liability of the husband to support his family, but it establishes an equal rule for both spouses, following the modern trend.

The general acceptance of mothers' pensions as a duty of the public which should not be left to private charity is another expression of the economic fact that the husband is still primarily the support of the family, but that on the mother falls the equivalent duty of keeping the home. The state recognizes that if the economic support fails in a family by the death or incapacity of the wage earner, the mother should be aided in her duty of home-keeping. The family unit must not be broken up while the children are young, nor must they be driven too early to work to help carry the family burden. The state goes further than paying only in case of death; it recognizes other incapacities of the husband as a ground for aiding the mother in preserving the family as the best nursery for future citizens. The converse of mothers' pensions has not been attempted by public action. How to take the mother's place in a home whence she has been removed, and how to keep the family unit from dispersing for lack of the binding force she supplies, is left to the husband and father to work out as he can. His loss or incapacity the state can in part supply, that of the mother leaves a gap which public action has so far not devised a way of filling.

Mutterings of dissatisfaction against some results of the principle that man must pay, are being heard, however, especially in respect to alimony. A few states by statute allow the court to grant alimony to the husband in case of divorce for the fault of the wife,[9]

[9] "Alimony Pendente lite for Husbands," 32 *Yale Law Journal*, p. 478. California, by Chapter 249 of the Acts of 1927, puts the wife and

but the courts are stern in refusing to help the husband unless the legislature has expressly enjoined them to do so.[10] North Carolina, by Chapter 529, Acts of 1923, recognized a case in which alimony should not apply, allowing the husband to plead the wife's adultery as bar of an application for alimony. If a woman divorces a man why should she not support herself if she is capable of doing so? Alimony to a husband is not in the American way of thinking, he cannot be permitted to depend on his divorced wife for support; why should women who enjoy the new freedom be so much favored as against their equals in other fields? The facts are stubborn, however, and their interpretation by the legislatures, even more by the judges, makes it clear that the family unit based on the earning power of the man persists as a basic social fact in the legal life of the twentieth century.

THE INTERNATIONAL MARRIAGE

The two principles, independence of the individual and unity of the family, come into sharp conflict in the case of international marriages. An American girl marries an Englishman; shall she have the right to retain her citizenship with the political and economic rights which are implied in it, or shall she, as a necessary consequence of her choice of a husband, become an Englishwoman whether she continues to live in this country or not? With the recognition of equal political and legal rights between men and women, this question takes on a more serious aspect than it did formerly. When a woman had no right to vote, no right to hold office, to share in the control of a political party, to sit on a jury, when by the fact of marriage she lost her right to act as a guardian or an administratrix or executrix, it made no difference if she doubly lost it as a foreigner. When there was no income tax with its changed incidence in case of foreigners, the question was not so vital. On the other hand, the husband and wife form one family. Would a divided political allegiance in this basic social unit be in conflict with the interest of the members of the family or of the state? What of the children born abroad? In case of an American family they would be born citizens, but if the wife only is a citizen, will the United States claim that the children follow her nationality or will they acquire the citizenship of the husband, thus leaving the wife a foreigner in her own family? Under the new freedom for women, however, the view of the individualist was strongly urged by organized groups of women. The Cable Act[11] represents a compromise. The American girl may retain her birthright of American citizenship, but, said the committee reporting the bill to Congress, "This bill in no wise affects the status of children. Those born abroad will, as heretofore, take the allegiance of the father." So American citizenship while heritable through the blood of the father is not heritable through the blood of the mother. The rule works both ways. A foreign woman becoming the wife of an American does not acquire American citizenship, nor is she naturalized when her husband becomes a citizen.

Evidently, however, the nationally divided family, which may result from this new rule, is not in itself desirable; the necessary sacrifice to the individual

husband on an equality in respect to alimony, so far as the legislature can.

[10] *Greene* v. *Greene*, 49 Neb. 546; 34 Lawyers Reports Annotated 110, with note; *State* v. *Templeton*, 18 N. Dak. 525; 25 Lawyers Reports Annotated 234, with note, but a county court in Illinois granted alimony to an invalid husband dependent, on the ground that the same rule should be applied to the husband as to the wife. *Groth* v. *Groth*, 28 *Chicago Legal News* 348.

[11] 42 Statutes at Large, p. 1022, Sept. 22, 1922.

must not be carried further than is essential. Acquisition of the husband's nationality must be facilitated so the formalities for acquiring citizenship are made easier for the foreign wife of a citizen and conversely, the American wife of a foreigner may renounce her citizenship in a naturalization court. Congress went a step further. It looked on acquisition of a foreign husband as an indication of a willingness to acquire foreign nationality; consequently the American wife is presumed to have abandoned her citizenship if she reside for two years continuously in the country of which her husband is a citizen, or for five years outside the United States. Equality of the sexes was not achieved under the Cable Act, but the assertion of the right of the woman to choose her nationality independently of her husband has had a wide repercussion in the world. The usual rule based on the unity of the family under the husband, that the wife follows her husband's citizenship and loses on marriage her own, is in force generally in other countries and results in many cases of American women with double nationality. For example, the American girl married to an Englishman would have British nationality in the British Empire, American nationality in this country, and could demand protection from either government when living in a country foreign to both the United States and Great Britain. Already there is a movement to cause the adoption generally of the American rule, and it would not be surprising if it were accepted as the answer to the problem of the conflict of personal independence and group unity in the international family.

It is interesting that the Cable Act returns to eighteenth century law. It was the French Civil Code, by Chapter 19, with the approval of Napoleon himself, that consecrated the rule that a woman should follow the nationality of her husband, conversely to the former law by which no such change came about as of right. Other countries slowly followed the new lead putting the unity of the family above the right of the sovereign to the allegiance of women born his subjects. The United States came around to the French view partially by the Act of February 10, 1855, R. S., Section 1994, which conferred citizenship on foreign women marrying Americans whether they wished or not, and finally by the Expatriation Act of 1907 [12] Congress decided that American women should follow the nationality of their husbands. The Supreme Court applauded this solution as not only "valid but demanded" by the facts of international life.[13] It is no small evidence of the power of the changing mores in the nineteenth amendment that in fifteen years so weighty a change in law could have come about so easily.

CONTROL OF CHILDREN

The unity of the family under the husband, expressed through the control by the husband of the children and their property, especially of the earnings of minor children, have been encroached upon by the lawmakers. The legal personality of the mother is emerging from its common law submersion in that of her husband. As a result she is taking the place of a partner in the family and in consequence the privileges which the common law vested in the father are being shared with the mother to the advantage of the child. Formerly the father was usually entitled to the guardianship of person and property of the minor children and only in case of his death, the mother. Under the twentieth

[12] Act Mar. 2, 1907, 34, Statutes 1229.
[13] *McKenzie* v. *Hare*, 239 U. S. 299.

century statute law, the rights of the parents are made equal, and in determining to which parent the child shall be entrusted, the welfare of the child is the controlling consideration.[14]

Ohio, by Chapter 121 of the Laws of 1923, puts the decision largely on an economic basis. Father and mother are joint natural guardians of a child, but the paramount right is in that parent who is actually supporting it. This parent will usually be the father, so that the final result may correspond to that of the common law; but it will depend on a question of fact, not on a rigid rule. North Dakota, by Chapter 155 of 1923, gives fathers and mothers of unmarried minor children equal rights to the custody of the children and to the control over their savings, while another aspect of the influence of the new order on the property of the children is evidenced by Chapter 80 of the Laws of Colorado of 1923, which authorizes the mother to join the father of an injured child in a suit for damages for the injury, and gives each parent an equal share in the judgment when a joint action has been instituted. Previously only the father could sue.

WOMEN AS A CLASS

The "legislative program to effectuate in a broad and liberal way the more modern conception of the place of women in the social, economic and political life of the country" has evidently taken into consideration "the fundamental difference of sex." [15] Equal rights for women does not mean that sex as a basis for classification under the police power is wiped out, and that laws to promote the interest of the community by protecting women are invalid.[16] In spite of the protest of some groups of women who feel that any special treatment of their sex is invidious, labor laws regulating hours and conditions of women's work have not deviated from the tendency established in the nineteenth century, to consider the health of the mothers of the race as of peculiar interest. The courts have not changed their approval of legislative action, when they were persuaded of the relation between the law and the health of women as a class. The Supreme Court has, however, indicated the influence on its members of the nineteenth amendment, as inclining the majority of the court to scan very closely a labor law affecting women only. Public policy nowadays is to put women on an equality with men so that when that public policy needs judicial help against assaults by the legislature, the court should be alert to reprove the lawmakers for their failure to observe the popular will.[17]

The legislatures generally have recognized this principle of difference in law based on difference in sex by proceeding step by step in amending statutes and changing the common law establishing the legal position of married women. The process is still proceeding at an accelerated pace since women became voters, but it is that of taking up specific rules, guardianship, the invalidating of letters of administration by marriage, the right to sue for injuries independently of the husband, extension of the right to contract, to property, examining them to see whether they are arbitrary restrictions on the legal personality of the woman, or whether they correspond to a substantial difference between husband and wife.[18]

[14] *Corpus Juris*, Vol. 28, p. 1080.

[15] *First National Bank* v. *Jahn*, 179 Wis. 117.

[16] *Muller* v. *Oregon*, 208 U. S. 412.

[17] *Adkins* v. *Children's Hospital*, 261 U. S. 525, p. 553.

[18] "Legislative Problems and Solutions," Ernst Freund, *Am. Bar Assoc. Journal*, Dec., 1921, Vol. VII, p. 656.

A notable exception to this process of legislative examination and a testimonial to the discretion of the courts of the state is the Equal Rights Law of Wisconsin.[19] After enacting that

> women shall have the same rights and privileges under the law as men in the exercise of suffrage, freedom of contract, choice of residence for voting purposes, jury service, holding office, holding and conveying property, care and custody of children, and in all other respects

the legislature goes on to say that

> the various courts, executive and administrative officers shall construe the statutes where the masculine gender is used to include the feminine gender unless such construction will deny to females the special protection and privilege which they now enjoy for the general welfare. The courts, executive and administrative officers shall make all necessary rules and provisions to carry out the intent and purposes of this statute.

This method of putting the responsibility on the courts has been sharply criticised,[20] but the court has cheerfully assumed the burden. "No doubt," it says, "some difficulty will be encountered in the application of this statute to the law generally. These difficulties, however, will not be insurmountable. In practice they may prove to be not even formidable."[21] In the first opinion it rendered, the court laid down the rule that the common law restrictions on the wife's capacity to contract were not "for the general welfare," but were for the benefit of the husband. Special protection and privileges enjoyed by women "for the general welfare" were only those established under the police power, relating mainly to labor, sanitation, and "related subjects."[22] Subsequent cases appear to carry out the optimistic hopes of the court that it could cope with its duties under the Act.[23]

The wife has received, generally, freedom to dispose of and to contract in respect to her individual property,[24] but in the institution of community property which exists in several Western states, the husband is recognized as the head of the community and so qualified to manage its property. The wife's right boils down to a right of survival. This situation has not withstood the new principle. There has been a general disposition in the legislatures to broaden the wife's right without limiting the husband's power as manager.[25] An example of the adjustment of an old rule to a changed public conscience is the modification in California of the wife's right to a share in the community property when the community was dissolved by the death of one spouse. Until 1919 the husband kept the whole if he survived the wife, and if she became a widow, she only received one-half, the other half being subject to his testamentary disposition, or went to his heirs. In 1919 the wife gained a point under Chapters 611 and 615, by which she got the right to dispose of one-half of the property by will, and in 1923, Chapter 18 completed her equality with her marital partner in the disposition of the community estate on death. At the death of either husband or wife, the whole goes to the survivor except that the decedent may dispose of one-half by will. The husband is continued after the death of the wife in

[19] Chapter 529, Acts of Wisconsin, 1921.

[20] *American Bar Association Journal*, May, 1925, Vol. XI.

[21] *First National Bank* v. *Jahn, supra.*

[22] *First National Bank* v. *Jahn, supra.*

[23] *Hero* v. *N. W. Iron Co.*, 181 Wis. 198. *Wait* v. *Pierce, supra.*

[24] "Community Property," McKay, 2nd Ed., Chapters 37 and 66.

[25] *Op. cit.*, Chapter 67.

control of the personal property during administration and also of the real estate unless a claim is put on record by a divisee under the wife's will.

ILLEGITIMATE CHILDREN

The harshness of the common law towards illegitimate children has been steadily mitigated by statute. A long stride was made in 1921 in Missouri. A child born out of wedlock became capable of inheriting and transmitting by inheritance from its parents, and conversely making its parents and other relatives its heirs as if born in wedlock. The paternity of the child, however, must have been established by an action at law begun during the life of the putative father. A survival of the old French rule, forbidding suits to establish paternity, occurs in a section of the statute which forbids a suit to establish paternity if father and child are not of the same race.[26] The extreme limit in the direction of regularizing the position of the illegitimate child has been taken by two states, North Dakota, by Chapter 103 in 1917, and Arizona by Chapter 114 of 1923. By these acts every child is made the legitimate offspring of its natural parents, with all the rights of the issue of lawful wedlock. The only limitation is that a child is not entitled to live in the home of his father if that father has married another woman than the child's mother.

LIMITATION OF USES OF PROPERTY

In the field of property law influences of public opinion are working to produce a limitation of the powers of an owner of property. In the case of women, that influence was exerted to exalt the powers of a group of individuals in what has amounted to a complete restatement of the law of married women and a beginning of a restatement of the law fixing the status of illegitimate children. Property law has been undergoing a modification in the opposite sense. The powers of the individual to do as he will with his own are being restricted to bring the institution of private ownership of real estate into keeping with modern conditions. Constitutions limit the power of the legislatures in language like that of the amendment of the Federal Constitution which forbids the states taking property without due process of law, so that the legislatures here must do their work of adjusting old law to meet new needs, under the supervision of the judges.

OIL AND GAS

An instance pregnant with possibilities is the Wyoming statute which forbade the use of natural gas for making carbon black. The heat in the gas must be "fully utilized for manufacturing purposes or for domestic purposes."[27] Whether this limitation on the power of the owner of land to use gas from his well as he chose, overstepped the limit of the police power and was a taking of property beyond the power of the legislature, came promptly before the court and, by a divided bench, the statute was sustained.[28] It had already been held that the legislature might forbid the waste of natural gas, in order to preserve the right of other owners in the field and advance the public interest in the utilization of a natural resource.[29] The Wyoming Act, however, went further and established prior uses for natural gas, not in the interests of the owner of part of a producing field or to preserve the use of the field as a unit for all owners, but in the interests

[26] Sections 311, 311a, 312, 314, Revised Statutes, Session Laws of 1921, p. 117.

[27] Chapter 19, Session Laws of 1919, Wyoming.

[28] *Walls* v. *Midland Carbon Co.*, 254 U. S. 300.

[29] *Ohio Oil Co.* v. *Indiana*, 177 U. S. 190.

of householders and manufacturers in the vicinity of the field who were given the first right to use the gas without any process of condemnation. Consequently the gas well owner must supply them and may well lose the advantage of a better paying market at the plant of a carbon-making concern.

The principle that wasteful utilization of natural resources may be forbidden has been followed in several states which have passed laws to regulate the production of oil and gas from the underground pools in which these fugitive substances collect. Primarily the regulations affect owners of land over the pools who are treated, to a degree, as owners in a common property, but they are enacted with an eye to the importance to the public of a regular market for gasoline and natural gas and to a continuation as long as possible of a steady supply from the limited underground storage in existence.[30] These laws have not been strictly enforced, but the results to the market for gasoline from the sudden oversupply from certain fields, and the anxiety over early exhaustion of the supply, have obliged the United States Government to consider seriously how far it may go in nation-wide regulations, and how far the individual states may go, in a drastic control over production, that is limiting the right of an individual to do as he pleases with his property where by so doing a public interest will be hazarded.

ZONING AND RENT LAWS

Most important of the legislative manifestations of this same doctrine are the zoning laws and the rent laws. Both have to do principally with the dense aggregations of humanity in large cities, but zoning and planning have already been applied to villages and even to country districts. Zoning is a development of the last quarter century and has made rapid progress. At first the cities, by ordinance under legislative grant of authority, restricted the height and bulk of buildings in specified areas. There was a vigorous attack on those ordinances as destructive of the right of private property, but the Supreme Court in a carefully reasoned opinion, showing the importance it attached to what it was doing, endorsed the legislative stand.[31] This was in 1908, and in 1926 the court had to face the result of its first decision. Since 1908, the movement to restrict the right of private owners of property had developed rapidly, and the new situation which the legislatures had created, limited not only the height and bulk of buildings, but their use as well. Zoning statutes allowed the zoning authority to forbid factories to operate in specified areas, to forbid shops in others, even to limit the building in certain districts to private houses. The movement has spread with great rapidity. On January 1, 1925, zoning ordinances were in effect in three hundred and twenty municipalities throughout the United States, with a population of more than twenty-four millions.[32] The number of zoned municipalities had risen in November, 1927, to over five hundred and fifty,[33] and the legislatures were busy in 1926 in extending and bettering the legal machinery for putting the reform into effect.

The state courts have taken very different positions in respect to how far zoning can go without interfering with

[30] "Regulation of Oil and Gas," *Am. Bar Assoc. Journal*, Apr., 1921, Vol. VII, p. 233.

[31] *Welch* v. *Swasey*, 214 U. S. 91.

[32] "Constitutionality of Zoning Laws," Newman F. Baker, *Illinois Law Review*, Vol. XX, No. 3, p. 217, citing Bulletin of the Dept. of Commerce for March, 1925, "Zoning Progress in the U. S."

[33] *American City Magazine*, Vol. XXXVII, p. 651.

the fundamental right of private property owners. In Louisiana, for example, the judges thought that the whole program was well within the police powers, that even restriction to dwelling houses in a particular zone was legitimate,[34] while in New Jersey the court considered that "the right of private property . . . called the keystone of the arch of civilization" would be endangered by permitting the exclusion of business from residence districts.[35] In the main, the judicial opinion coincided with the legislative, that the reform was needed under modern conditions and was an adaptation of well-known principles of law to a new situation. When the constitutionality of zoning came before the Supreme Court in the fall of 1926, the institution had been so widely accepted and put into operation, that the court could pass on the question whether it resulted in taking property without due process of law, in the light of widespread experience and general acceptance by the state courts. The court did what was expected and sustained the principle of zoning, although it did not pass on the extreme cases, notably of limiting a specified area to dwelling houses alone.[36]

The rent laws, resulting from the overcrowding after the war, were another evidence of the public will to limit the previous right of owners of urban real estate. Such legislation was nearly universal in Europe and was widely adopted in the United States, where it was expressly limited to the duration of the existing emergency. The laws were sustained by the Supreme Court as emergency legislation, but some of the expressions used in the opinions go far towards recognizing the principle that at least in crowded cities the legislatures may treat buildings as a sort of public utility. Said the court: decided cases "are enough to establish that a public exigency will justify the legislature in restricting property rights in land to a certain extent without compensation. But if, to answer one need, the legislature may limit height, to answer another it may limit rent."[37] The cases cited did not apply to statutes limited in time, among them was *Welch* v. *Swasey* approving an act taking away "the right to erect buildings in a certain quarter of a city," unless they were under a specified height. Subsequently the Supreme Court held that the particular emergency to meet which the rent laws in Washington were passed, had ceased, and that the legislature by its fiat could not make that true which the court knew to be false. The right to regulate rent, however, depends on a question of fact, whether a public need exists.[38]

The New York legislature has applied the theory that tenement houses could be made a public utility by Chapter 823 of the Session Laws of 1926.[39] Corporations may be formed to build tenements under supervision as to certificate of necessity, to the issue of securities and regulation of rent, which are evidently borrowed from the public service corporation laws. These corporations may condemn land for their purposes so that the "hold-up" value of one lot in a block will be taken away from the owner, a new sacrifice of the individual to the community. This is

[34] *State* v. *New Orleans*, 97 So. 440.

[35] *Ignacious* v. *Risley*, 98 N. J. Law 712; 121 Atl. 783.

[36] *Village of Euclid* v. *Ambler Realty*, 47 Sup. Ct. R. 114.

[37] *Block* v. *Hirsch*, 256 U. S. 135, p. 155. See also *Brown Holding Co.* v. *Feldman*, 250 U. S. 178; *Edgar A. Levy Co.* v. *Siegel*, 258 U. S. 242.

[38] *Chastleton Corporation* v. *Sinclair*, 264 U. S. 543; *Peck* v. *Fink*, 2 Fed. Reported, 2nd Series, p. 912. *Edgar A. Levy Co.* v. *Siegel*, 258 U. S. 242.

[39] "Legislative Attack on the Slums," *American Bar Assoc. Journal*, Dec., 1926, Vol. XII, p. 849.

important, as it is recognized that the present development of cities by building on lots instead of on whole blocks is wasteful. If a block can be developed as a whole, an equal or greater number of families can be accommodated in its area, dark rooms can be done away with and space be left over for a playground in the center. Not only will the health of the community be bettered by the greater free space in congested quarters, and by the provision of play space, but the new sky line of buildings and the possibilities of form and mass in construction will transform, aesthetically, the dismal tenement districts of our great cities.

Thus it is evident that we are living in an age of change, just as every generation has lived in an age of change. The great milestones on the road of advance in the law, The Woman Suffrage Amendment, The Cable Act, The Zoning Laws, mark a result which has been achieved by slow stages, by the popular opinion, and they are not to be thought of as finger posts showing a sudden turn in the road of progress or a sign of danger ahead. They are an evidence that the community, in advancing on the folkway it has followed, has reached the point they mark and must be accepted as an indication of the line of future advance.

The Development of Substantive Law on Social as Distinguished from Purely Governmental Lines

By Marvin B. Rosenberry
Justice, Supreme Court of Wisconsin

In earlier times substantive law was concerned mainly with the protection of the life of the citizen and his right to the enjoyment of his property. To preserve the peace and administer justice were the principal functions of established government. Far-reaching changes in the social structure have made it necessary for the law to take notice of a new set of relationships which are ordinarily spoken of as social.

Human conduct out of which these relations have sprung was divided by Lord Moulton into three domains: first, positive law (statutes and decisions); second, obedience to the unenforceable (moral and social restraints); and third, free choice. Relations which fall in the first class may by changing conditions be thrown into the second or even the third class. More frequently it happens that matters which lie within the second class are removed therefrom to the domain of positive law, likewise matters which are the subject of free choice in one time may be the subject of positive law in another, depending upon the customs, habits, traditions and ethical concepts of the particular time. However strongly a rule of conduct may be sanctioned by custom, tradition or social usage, if it is not one which will be recognized by the officers of the state charged with the enforcement of law, it remains in the field of obedience to the unenforceable and is said to be non-jural in character. On the other hand, rules of conduct which will be enforced by the state are said to be legal or jural in character and out of these spring rights, privileges, powers and immunities with their correlatives, duties, no rights, liabilities and disabilities. It is only when a rule of conduct has been lifted into the field of positive law by statute or court decision that it becomes enforceable and operates to create legal rights and corresponding legal duties.

Growth of Law

In the main, law grows by accretion. In a primitive society custom, habit and tradition occupy a larger place than does positive law. From time to time as government becomes more efficient, the people more intelligent, society more complex in order to maintain ground won in the fight for social progress, certain matters are lifted out of the field of non-jural relations or obedience to the unenforceable and are placed in the field of positive law for the protection of society. In times of rapid social change this shifting process is correspondingly accelerated. The reason for the acceleration is that in periods of rapid shifting of social relationships there is not time for the development of non-jural sanctions of sufficient force and vitality to control the situation. Under such circumstances resort must be had to positive law.

American Law

American law is the development of the English common law upon the soil of America. It was derived from and adapted to a society which was pre-

dominantly rural and agricultural in character. Its more recent development illustrates in a most striking way the effect of social changes upon substantive law. The common law developed very slowly. In it are found elements of the law as it existed in England before the Norman conquest which brought many far-reaching changes. Its development was also influenced by the introduction of the civil law by the ecclesiastical courts. But running through it all as warp runs through cloth were the customs, habits and traditions of the English race. The enjoyment of political freedom which meant equality before the law was the dominant desire of that race. Given this, it was assumed that the individual would be able to maintain and care for himself. This ideal was embodied in the philosophy of John Stuart Mill and is described as the *laissez faire* or let alone theory of governmental policy. Our constitutions, state and national, are strongly impregnated by this theory.

FUNDAMENTAL CHANGE

While this theory was developing, society underwent a far-reaching fundamental change. The rural, agricultural order of the early part of the nineteenth century was transformed in a single lifetime to the highly, organized, complex, industrial society of the latter part of the nineteenth century. The character of this change was not recognized at first either by the people, by the legislatures or by courts, with the result that great abuses grew up under the new order of which the old law took no account and for which it provided no remedy. It was the intrusion of these new situations into our life that brought about a more general recognition of the fact that equality before the law did not produce economic equality and that political freedom did not insure the weaker against oppression by the stronger members of society. Experience forced upon the minds of lawmakers the fact that under the new order recognition must be given by substantive law to large sections of human conduct theretofore resting almost entirely in the non-jural field. The sanctions of habit, custom and tradition proved insufficient to maintain a proper social equilibrium. In the long run the substantive law is mainly the crystallization of social experience. In more recent times law has been projected by statute into social space and it has been proved by subsequent experience to be erroneous and a hindrance rather than an aid to social advance. As a consequence there have been many adaptations and readaptations which are always necessary in order to make law conform to social needs.

THE NEWER VALUES

A detailed statement of the manner in which these newer values were recognized and incorporated into substantive law would be beyond the limits of this paper. The most that can be done is to indicate in a general way what the newer values are and how they were treated.

The application of steam, gas and electricity to productive processes made operation in large units economically desirable. One by one the simple manufacturing processes of the farm and village were taken over by organized industrial units with a large proportional increase in the number of workers employed in each unit and a corresponding decrease in the number of units. When the ratio of employers to employes was as one to five, something like equality of bargaining power existed, but when the ratio rose to one to one hundred or five hundred, that equality disappeared and the situation

thus created early came to the attention of the law-making power.

MASTER AND SERVANT

The relation of master and servant has been long known to the law, but the common law of master and servant was not at all adapted to meet the needs of a highly organized industrial society. Voluntary organizations of workers were formed and many devices invented in an attempt to restore the disturbed equilibrium. Powerful as the unions were it was found necessary to adopt laws relating to conspiracy, authorizing collective bargaining, providing courts of mediation, fixing minimum wages, hours of labor, providing for periods of unemployment, protecting the person and health of employes, providing compensation for injuries, so that in the course of three decades matters which had lain for centuries in the field of custom and in the domain of obedience to the unenforceable were set over into the field of substantive law.

EDUCATION

The free school along with the free church and free government came to us as a heritage from the fathers. The demands of a highly industrialized society made education not only desirable but, if a reasonable degree of efficiency was to be secured and maintained, absolutely necessary. It was no longer sufficient for the worker to have a skilled hand,—he must have behind it a skilled mind. Very early a liberal policy was adopted in educational matters, and at the present time substantially one-half of the amount of money raised by taxation in the states goes in one form or another to education. The public school system has relieved the home of responsibility for education, takes over children of the age of six and directs their lives until they are eighteen years of age. It has thus become a dominant factor in the life of the nation.

HEALTH

With the concentration of great numbers of people within comparatively small districts, sanitation and generally health conditions become absolutely imperative. The common law dealt with nuisances, but it knew no such standards as have been erected by statute law in the last half century. Sanitary engineering is now a distinct profession and one must travel to other lands to realize the tremendous change wrought in our life by taking from the individual or the family the control of those matters which relate to its health and general well-being. Under the rural, agricultural order the majority of people produced their own food. The feeding of great urban populations presented new problems. Adulteration, misbranding, frauds of various kinds crept in until the matter was set right by the enactment of the Pure Food and Drugs Act by the United States and similar laws by most of the states.

DELINQUENTS AND DEFECTIVES

While the attitude of society toward the criminal has undergone less change and is more medievalistic than it is in any other respect, nevertheless a comparison of the conditions under which delinquents and defectives are now cared for, reveals a tremendous advance over former time. The family is relieved from the care of these unfortunates and thus its time and energy are made available for society. The fact that the amount disbursed for social welfare work by voluntary organizations is nine times as great today as it was twenty-five years ago may be taken as an indication that far-reaching changes may be expected

with reference to the care of delinquents and defectives within the next quarter century.

DISTRIBUTION OF WEALTH

Naturally in an acquisitive society developed along the line of material as opposed to spiritual values, one of the most difficult problems is to secure an equitable distribution of wealth. Any proposed theory must deal with firmly established standards evolved in an individualistic society. How to distribute wealth so as not to paralyze initiative, displace intelligent, effective management and not reward incompetence, indifference and shiftlessness is indeed a problem. The development of a spirit of philanthropy and responsibility for general social welfare has benefits but does not meet the real issue. Old age pension, mothers' pension, unemployment insurance, health insurance and various other devices to a limited extent bring about a redistribution but do not affect primary distribution. While the development of the law along social as distinguished from purely governmental lines has had economic consequences, they are not such as to justify the hope that the problem can be solved by approaching it from that angle. Profit-sharing schemes, democratic management of industry, wide distribution of corporate ownership are preparatory steps in the solution of this problem. There can be little doubt that in the process substantive law must in some way be brought to the aid of other forces working for a fairer distribution of the proceeds of industry.

OTHER SUBJECTS

The matters discussed present but some of the more fundamental of the social values recognized in recent times by positive law. City planning, zoning, protection of mothers, protection of women and children, old age pension, unemployment insurance, mothers' pension, quarantine, out-of-door relief and many other matters have been dealt with by recent statutory law in the light of advanced scientific knowledge. This generation is making a truer answer to the question "Am I my brother's keeper?" than did its predecessors. As we are removed farther and farther by science and invention from the struggle for a bare existence, there is every reason to believe that social obligations will be more readily recognized and justly discharged and in this process positive law will have a necessary and important function.

CONSEQUENCES

Legislative recognition of newer social values by the enactment of substantive laws has produced an avalanche of statutory law. Considering the statute law of the states and of the United States it is literally true that tens of thousands of statutes have been passed and other hundreds of thousands of measures have been considered in an effort to bring about a readjustment which will secure to the new industrial order the same certainty and security in the substantive law that prevailed under the old rural, agricultural order. Thousands of these laws will shortly become obsolete because social experience will soon demonstrate their worthlessness. Like all movements in a democracy this movement has tended to run too far and too fast. It is difficult to maintain an equilibrium. Lifting matters out of non-jural field or obedience to the unenforceable as Lord Moulton calls it and placing it in the field of substantive law does two things: first, it weakens the citizen's sense of individual responsibility; and second, overloads and clogs the law enforcing processes, so that there is a double social loss.

Habit, custom and tradition will shortly assert themselves in the new order as in the old and an awakening social conscience will render less imperative changes in the substantive law to meet the varying phases of the situation that our social advance discloses.

The Effort to Harmonize Laws in the United States—Uniform Laws in General

By William M. Hargest

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THERE is a growing interest in the effort to harmonize the laws of the various states, and considerable discussion concerning uniformity reveals the fact that the subject is not as well understood as it might be among those who are not actively engaged in its promulgation. There are those who think that uniformity is the cure for many of our juridical ills; others believe that uniformity can be overdone. The principle of uniformity in laws is not new; it is as old as the nation. Alexander Hamilton first agitated it; he was the instigator of a movement which resulted in a convention, called in Annapolis, in 1876, to consider how far a uniform system in the commercial requirements of the colonies was necessary to the "common interest and to permanent harmony." The purpose of that convention was, of course, to devise some means for the regulation of trade, but ever since that time there has been a growing need for uniformity of law.

How Our Diversity of Law Arose

When our forefathers brought over the common law of England there was little diversity of law or of legal principles. But it is not surprising that diversity developed. Geographic, economic, social, religious and political conditions differed and continued to differ in the early stages of our colonies, states and territories. In religion, Massachusetts was Puritan, Maryland Catholic; in business, some of the colonies were commercial, others agricultural; in the North the Negro was free, in the South he was a slave. Such differences naturally gave rise to a diversified jurisprudence. In the time of the stagecoach states were very far apart, with infrequent communication and little commerce. These diversified conditions naturally found expression in the statute law and in the decisions of the courts in the early days. Diversity was not serious so long as there was little business, but with the coming of the railroads, the consequent development of the country and the increase of commerce, this diversity began to present complex problems which became more intricate as the states were brought into closer business relations by rapid transit, the telegraph and telephone. As living conditions became more complicated new laws were required and more decisions of courts ensued. Both the laws and the construction of them created diversity. Perhaps some diversity was justified, but much of it could have been prevented if there had been some concentrated movement to prevent it. While at one time living conditions in the various sections were different, it is not so today. Now the people of one state live very much the same as those of another. Maine and California are relatively closer and more alike today than Massachusetts and Maryland were a century and a half ago. Commerce has obliterated state laws. Eastern investors have found Western

outlets for their money and there no longer remains any reason why a note or check given in one state and payable in another should not have the same rights and be subject to the same regulations in both.

Our political, social, commercial and industrial relations are now becoming so similar that they do not demand different legal treatment. Would it not be better for us to have the same rights and the same redress for our wrongs? The remedy, then, is to make the laws uniform on such subjects as it is desirable to have uniformity.

THE DESIRE FOR UNIFORMITY

The desire for uniformity arises from two causes: (a) the tendency of democratic governments toward centralization, and (b) the demand for efficiency. DeTocqueville says [1] "Democratic nations are more disposed to fall beneath the yolk of centralization." The tendency to national life, the growing consciousness of our American nationality, has prompted a desire for uniform justice in this country. Uniformity has been obtained, in part, through the national laws, but to obtain uniformity in this way requires a surrender of the rights of local government.

Because of the richness of our national resources and our prosperous commercial development, we have, perhaps, been too insistent in our demand for governmental efficiency, without any regard for the change that may be made in the fundamental principles and scheme of our government; too willing to sacrifice our ideals for the momentary advantage which we conceive such efficiency will bring. In big business centralization of authority is regarded as making for efficiency. A great business organizer or executive may not have the best judgment as to the best governmental policies. The business of government is big business, but it is a business which is best conducted when every citizen takes an intensive interest in its outcome. There is great danger in bending every energy toward an efficient central government, thereby tending to violate the spirit of our institutions and lessen the interest in local self-government that every good citizen ought to have and foster. Have we not reached the danger point in the surrender of the powers of local self-government and will not any further surrender tend to destroy our fundamental ideals and weaken our governmental system? We lessen the interest of the individual citizen in his government in the proportion that we remove it from him. We cannot turn all the wheels of our great governmental machinery from Washington. Our interests are too vast and complicated. Elihu Root once said:[2]

> The ultimate object of all government is the home, the home where our people live and rear their children, with its individual independence, its freedom. . . . Do not let us in our anxiety for efficiency cast away, break down, reject, those limits which save to us the control of our homes, of our own domestic affairs, and of our local governments.

HOW CAN UNIFORMITY BE OBTAINED? WHY DIFFICULT

The remedy is not the surrender of more states rights and police powers and the establishment of more bureaus and the concentration of more authority at Washington, but rather by uniform state enactments. Thus we preserve both our national and state ideals.

To attain that purpose the National Conference of Commissioners on Uni-

[1] "Democracy in America," Ch. 5, p. 94.

[2] "Importance of Seeking Reform through State Governments." Delivered at Tenth Annual Dinner of National Civic Federation, November 23, 1909.

form State Laws was organized, in 1890, and some of our best legislation has resulted from its labors. This National Conference is a unique body. It is semi-official in its nature and is composed of commissioners appointed by the governors of the various states. Though it has no official connection with the American Bar Association it is intimately identified with that Association. It meets for a week immediately preceding the meeting of the Bar Association and at the same place. Men of outstanding ability devote their time and talents, without compensation, and sometimes attend the sessions at their own expense, in the interest of that great cause. The result of the work of the Conference has abundantly justified its existence. Its outstanding achievements have been in the domain of commercial law and substantial progress toward uniformity has been made. The Uniform Negotiable Instruments Act has been adopted in every state and jurisdiction, fifty-two in all; the Uniform Warehouse Receipts Act, in forty-eight; the Uniform Sales Act, in twenty-eight; the Uniform Bills of Lading Act, in twenty-seven; and the Uniform Stock Transfer Act, in twenty-one.

In the lay mind, however, uniformity is invariably associated with the divorce problem. One of the first acts to be recommended by the National Conference was a Uniform Divorce Act. It was not received with favor. It is apparent that the states are reluctant to change the grounds on which a divorce may be obtained. And, strange as it may seem, little progress has ever been made in the domain of any social welfare acts, with the exception of the Uniform Desertion and Non-Support Act. The National Conference has proposed sixteen commercial acts, with two hundred and fifty-four enactments. It has promulgated eight social welfare acts, with forty-one enactments, twenty-one of which were of the Desertion and Non-Support Act, leaving seven of such acts with but twenty enactments. So that, notwithstanding what the people may think generally as to the necessity of uniform legislation in social relations, when uniform acts on such subjects as marriage, divorce, marriage license, child labor and vital statistics, have been prepared with great care and recommended to the states for adoption, little response has been found in the legislatures of the various states. But the National Conference of Commissioners on Uniform State Laws has persisted in its efforts to secure uniformity in social welfare. It now has a committee considering a revision of the Uniform Divorce Law in the hope that it may present a uniform law more acceptable to the several states.

The question of carrying firearms also illustrates the difficulties in the way of uniformity. An act regulating the purchase and carrying of small firearms has been prepared by the National Conference. The eastern states, and particularly the police authorities of the larger cities, severely criticize the act as not being in any sense sufficiently drastic, whereas the western states regard it as taking away liberties which they cherish, to such an extent that it called forth a veto message of ridicule from the governor of one of those states.

There is another hindrance to the cause of uniformity. States sometimes become wedded to their laws, and it requires strong reasons to change them. To illustrate: many of the western states have been especially anxious for a uniform act on the subject of real estate mortgages and the National Association of Real Estate Boards has insistently urged the preparation of such a uniform law. After a number of years of work the National Conference

of Commissioners has recommended such a statute, but there is no hope of attaining complete uniformity on this subject because many of the states are quite satisfied with their laws as they now stand. The same is true as to a uniform incorporation act which has just been promulgated after ten years work. But these acts are model laws for those states which may desire to change their statutes, and thus uniformity will be partially obtained.

It sometimes happens, also, that reforms in the law develop with such rapidity that diversity arises before a uniform law can be prepared. The statutes regulating workmen's compensation are illustrative of this. Not very long ago we knew nothing of workmen's compensation laws, yet when the principle involved commended itself to the people acts were adopted in the various states with such rapidity that most of the states had passed such laws, with varying provisions, before the National Conference of Commissioners, working with the care and conservatism that is characteristic of it, could prepare and offer to the states a uniform law on that subject. Diversity in the acts creating commissions for the regulation of public utilities arose in precisely the same way.

DANGERS OF ILL-ADVISED ATTEMPTS

The cause of uniformity is often hindered by the effort to attain it on the part of some national associations operating in a particular field. Such an association prepares an act largely from its point of view and to protect the interests it represents. For instance, if the American Warehousemen's Association had prepared and promulgated the Uniform Warehouse Receipts Act, it perhaps would not have been the fair and impartial piece of legislation that it is and might not have received such universal approval. Legislators might well have been wary lest the protection of the warehousemen was the uppermost thought in a statute emanating from such a source. It is for this reason that uniform acts promulgated by the National Conference of Commissioners have received such widespread approval. When that body promulgates an act it is after a complete examination of all the present laws on the subject and the fullest consideration of every interest in the subject matter. Sometimes the National Conference is asked to undertake the preparation of a uniform law on subjects where uniformity is both impractical and undesirable. To illustrate: it was proposed that all the states of the Union should pass a uniform law defining what constitutes a sanitary bed. It has also been urged that there should be a uniform law regulating milk bottles so that the same kind should be required in all the states.

UNIFORM LAWS KEPT UNIFORM

Here the answer rests largely with the courts. In the preparation of acts which the National Conference of Commissioners recommend there is the utmost care exercised both as to subject matter and expression. The necessity for uniformity is first determined by a proper committee, the subject is then considered by another committee which sometimes employs an expert draftsman. No act is ever recommended until it has at least two years' consideration, section by section, by the Conference itself. Notwithstanding all these precautions, the frailty of human language is such that the courts sometimes make different interpretations of the same statutory provisions. This at once reintroduces diversity. The courts are often impelled to such diverse constructions because they are wedded to the law as it previously existed in their jurisdictions. To im-

press the courts with the necessity for uniformity, the National Conference inserts in every act recommended by it the following section: "This Act shall be so interpreted and construed as to effectuate its general purpose to make uniform the law of those states which enact it."

Concerning this section, and the tendency of the courts to which we have referred, Mr. Justice Hughes said:[3]

> It is apparent that if these uniform acts are construed in the several states adopting them according to the former local views upon analogous subjects, we shall miss the desired uniformity and we shall erect upon the foundations of uniform language separate legal structures as distinct as were the former varying laws.

After referring to the section above quoted, he continued:

> This rule of construction requires that in order to accomplish the beneficent object of unifying, so far as is possible under our dual system, the commercial law of the country, there should be taken into consideration the fundamental purpose of the uniform act, that it should not be regarded as an off-shoot of local law.

The courts of New York and Arkansas, on the one hand, and Missouri on the other, illustrate these two practices. After the Negotiable Instruments Act was passed in New York there were several decisions which failed to recognize the change made in the prior law of that state, but later the Court there said[4] that by the passage of the uniform act the legislative intent was to harmonize the conflicting decisions of that state with other jurisdictions. In Arkansas the courts adopted the same attitude.[5] In Missouri, however, the Supreme Court in three cases[6] decided after the Uniform Negotiable Instruments Act was passed in that state, adhered to a prior decision of that Court without even referring to that act, notwithstanding the apparently plain language of the statute. So it is readily seen how the courts are often responsible for the failure to obtain uniformity even though the legislatures tried to secure it.

The National Conference of Commissioners on Uniform State Laws, recognizing that the courts introduce diversity, has constantly endeavored to bring to the attention of the courts the decisions of other states construing the various uniform laws. While it is a legal principle that the decisions of the courts of other jurisdictions are not authoritative but persuasive only, yet the courts of some states have held that the provision that is inserted in the uniform laws which has been above quoted has the effect of making such a statute of another state of binding rather than persuasive force.[7] So the cause of uniformity continues to advance even to the extent of so favorably impressing the courts that some of them, at least, have adopted a new legal principle, namely, that a decision of the court of another state on a uniform statute is binding, although it would be persuasive only in construing a statute not intended by the legislature to be uniform.

But the subject of uniformity in law still requires a vast amount of education among the people. In social welfare legislation such as divorce, desertion, and child labor, both the people and legislators must be brought to see that

[3] *Commercial National Bank* v. *Canal—Louisiana Bank & Trust Co.*, 239 U. S. 520.

[4] *Broderick & Bascom Rope Co.* v. *McGrath*, 142 N. Y. S. 497.

[5] *First National Bank* v. *Brunk*, 280 S. W. 372.

[6] *National Bank of Rola* v. *First National Bank*, 125 S. W. 513; *National Bank of Commerce* v. *Mechanics American National Bank*, 127 S. W. 429; *Citizens Trust Co.* v. *Ward*, 190 S. W. 364.

[7] *Stewart* v. *Hansen* (Utah 1923), 218 Pac. 959; *Etna Chemical Co.* v. *Spaulding & Kimball Co.* (Vt. 1924), 126 Atl. 582.

it is far better to attain uniformity than to adhere to the old law, however venerable it may be, and also to see that it is quite as undesirable to have many of our social relations, as it is our commercial relations, determined by state lines.

To the extent that the work of the National Conference of Commissioners on Uniform State Laws is better understood and to the extent that the country is better educated to the needs of uniformity and to the subjects upon which uniformity is really desirable, to that extent will uniformity of law be more readily attained.

Newer Developments and Tendencies in International Law[1]

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A SURVEY of the progress of law must necessarily comprehend the modern influences upon the content of the jural system governing international relations and conduct. Whatever pessimism World War experiences may have created concerning the stability of international law must yield to a realization of the progress which is being made in its improvement—in reforming its philosophical bases; in revivifying the established rules which are consonant with modern concepts; in crystallizing innovations adapted to changed economic and political conditions or to scientific inventions, and in promoting recourse to judicial process.

The milestones of recent progress in this branch of law lie more in the field of international legislation or reformulation than in the individual revelations of jurists or in the detached judicial pronouncements. They are, to an appreciable extent, the product of influences related to the work of the League of Nations, in whose more general activities, not involving the question of fundamental organization, the United States has frequently cooperated.

This article essays to treat of the developments in selected problems of legal adjustment of international relations, mainly in times of peace, and to indicate their discernible tendencies, without, however, intending to minimize the consequence of others which space precludes from review. Some of these developments which are first noted have been induced by the inventive genius of the times; others originated before the war, and still others are due to more recent impulses of social or political character. They are all, however, rooted in the advancement of civilization.

The most far-reaching and constructive contribution to international law may be confidently expected to come from the establishment of the Permanent Court of International Justice and the gradual, progressive and systematic codification of the rules of international law.

International Traffic in the Air

But scant mention of the subject of international communication by radio and aircraft is necessary to a realization of their international importance. "The art of communication," aptly observed Owen D. Young, in a recent address, "underlies all other arts. The business of communication underlies all other business." The exploits in this field carry in their wake important problems of international right and obligation.

Aviation

Aviation, although a new art, has a fundamental relation to established principles of international law. It involves important questions of sovereignty, international relations in times of peace, and control in times of war.

One of its first international phases is

[1] The writer regrets that limitations of space have required him to dispense with the citation of authorities for, and sources of, the material brought together in this article.

the allocation of the sovereignty of the air space. The question whether the State, under international law, is the sovereign of the air space superjacent to its territory and territorial waters, may now well be answered affirmatively, although there have been weighty assertions to the contrary, especially in the earlier years of the period during which discussion of the subject has been most active. The Roman maxim, "*Cujus est solum, ejus est usque ad cœlum et ad inferos*" was readily suggested as disposing of the question, but it does not furnish a satisfactory parallel between ownership in private law, even though it involve collective rights of individuals, and sovereignty in international law. It seems more reasonable to assume that sovereignty of the air space came into being with the effective use thereof, and is, therefore, a recent development in international law.

Continental European jurists, at first, generally advocated freedom of aerial navigation, limited only by the security of the subjacent states. On the other hand, English and American writers generally have asserted unlimited sovereignty over the air space above a state, and the latter is now the prevailing view.

State sovereignty in the superjacent air space was affirmed by the Pan American Aeronautic Federation, at a meeting at Santiago, Chile, in March, 1916; by the Commission on International Air Navigation, functioning at the Paris Peace Conference of 1919; by Norway and Sweden, in an agreement relating to aviation, concluded May 26, 1923; and by the American Institute of International Law, in a Project on National Domain, prepared for the consideration of the International Commission of Jurists, which met at Rio de Janeiro in 1927.

The British Air Navigation Act of 1920, in the preamble, recited that "the full and absolute sovereignty and rightful jurisdiction of His Majesty extends, and has always extended, over the air superincumbent on all parts of His Majesty's dominions and the territorial waters adjacent thereto. . . ."

Section 6 (a) of the United States Air Navigation Act of 1926 declares "that the government of the United States has, to the exclusion of all foreign nations, complete sovereignty over the air space over the lands and waters of the United States, including the Canal Zone."

International regulation of aviation was first prompted by control of warfare, at The Hague Peace Conferences. The subject received study and consideration by the International Juridic Committee on Aviation which was organized in Paris in 1909, and by the Institute of International Law, at sessions in Madrid in 1911, and, since then, notably at its 1927 meeting in Lausanne. Principles of the law of the air were declared at the meeting of the Pan American Aeronautic Federation held at Santiago, Chile, in 1916. The first international agreement regulating aviation was concluded between France and Germany in 1913.

The most important international convention dealing with aviation was adopted at Paris, October 13, 1919, at a meeting of delegates of numerous nations, including the United States, and has taken effect as to thirteen Powers other than the United States. Many of its features have been embodied in the Air Commerce Act of 1926, and it has served as a model for other conventions. It contains forty-three articles, dealing with general principles; sovereignty over air space above national territory; freedom of innocent passage; prohibited areas, and landing of aircraft after being above a prohibited area.

A project of convention similar to the Paris Convention of 1919 was submitted by the Pan American Union to the International Commission of American Jurists, which met in Rio de Janeiro, in 1927, but was later withdrawn from the Commission. Separate consideration was given to the subject by an Inter-American Commission on Commercial Aviation, attended by delegates of fifteen Pan American States, which met at Washington, in May, 1927, and which drafted a project of a convention regulating commercial aviation in the American hemisphere, for submission to the Pan American Conference of 1928. A provision in the project that nationality of aircraft shall follow the State of registration was opposed by the United States, Cuban and Venezuelan delegations, who advocated that no aircraft should be registered in any of the contracting states unless ownership was vested in a national of such contracting state or a partnership or corporation controlled by its nationals.[1]

RADIO

Earlier international regulation of radio traffic was embodied in the International Wireless Convention of Berlin of 1906, and the International Radio Telegraph Convention of London of 1912, together with the regulations adopted in pursuance of those conventions. In addition, The Hague Conventions of 1907 dealt with certain features of the use of radio in land and maritime warfare. The United States was a party to all of those conventions; but a number of other Powers did not become parties to one or more of the conventions.

Since the war a comprehensive convention and regulations have been approved at an International Radiotelegraph Conference, held at Washington in 1927, and war-time rules have been formulated by a Commission of Jurists and their Military and Naval Advisors which met at The Hague, 1922–1923; but neither of these have yet been generally ratified or adopted.

The question of the legal right to forbid international passage of radio signals may not be regarded as settled. It has been asserted by publicists that a state possesses the right to forbid the passage over its territory of waves emanating from a foreign radio station. But the phenomena of radio transmission are still baffling. Obviously, the force which propels the signals between radio stations traverses space. But dominion over superjacent space has not infrequently been limited to things having, or capable of, some connection with, or attachment to, the soil.

As the practical utilization of radio was, at first, principally for marine communication, the early conventional regulations dealt with communications between ship and ship and between ship and shore station, with the principal object of promoting safety at sea. The Washington Convention of 1927 deals more broadly with communication between fixed stations, between mobile stations, and between mobile

[1] Among other agreements, international in scope may be mentioned the agreement relative to customs regulations applicable to air traffic, concluded between the United Kingdom, Belgium and France, at Paris, on May 5, 1926; the agreement relating to air navigation, concluded between Norway and Sweden, at Stockholm, May 26, 1923; the informal agreement, made by the United States and Canada, in 1922, by an exchange of notes, permitting international aircraft flights, which has been renewed from year to year.

Since this article was written, the progress of a convention on commercial aviation, as amended by the subcommittee of the Committee on Communications has been unanimously approved by the delegates at the Pan American Conference, at Havana, in February 1928. Article 7 provides that aircraft shall have the nationality of the state in which they are registered and cannot be validly registered in more than one State.

and fixed stations, and encompasses all useful and commercial purposes.

A distinction has also been made between governmentally owned services and privately owned services.

Upon the invitation of the United States Government, an International Radiotelegraph Conference was held in Washington, October 4—November 25, 1927, in which delegates from seventy-nine nations participated, including practically every country in the world that uses radio.

The American delegation sought to differentiate the situation of the United States, in which radio enterprises are privately owned, from that of countries which both own and operate their communication facilities. It declared that this Government "has always stood committed to the principle of private ownership and operation, subject to such governmental regulations as may be necessary to prevent abuse and insure fair service." It proposed, therefore, a recognition of the essential differences between (1) those fundamental principles which are basic and permanent in the communication structure, and (2) managerial matters which are of changing character.

The Conference adopted a Convention and Annexed General Regulations, and also a set of Annexed Supplementary Regulations. By the convention which is to go into effect January 1, 1929, the contracting governments undertake to apply the provisions to all governmentally established, managed, or operated public international radio communication stations, and to take or to propose to their respective legislatures the necessary measures to impose the observance of the provisions upon privately established and operated international-radio-communication stations.

To each contracting country is reserved its entire freedom with relation to the organization of the service of, and the determination of the correspondence to be exchanged by, stations carrying on communication between "fixed stations," But, when such stations carry on an international service of public correspondence, either from country to country or with "stations in the mobile service." they must conform, respectively, for each of those two classes of communications, to the provisions of the convention and regulations. Intercommunication between stations participating in the "mobile service" is made obligatory "without regard to the radio system adopted by them." However, this provision is not to prevent the eventual use of a radio system incapable of communicating with other stations, due solely to the specific nature of that system.

Other provisions are made for facilitating and protecting radio communication, and improving the technique of the regulations, as well as for adherence by non-contracting countries. For the first time, provision was made, in the Regulations annexed to the convention, for the allocation and use of wave lengths.[2]

[2] The United States, Canada and Honduras did not sign the Supplementary Regulations which include rules applicable only to countries adhering to the International Telegraph Convention of St. Petersburgh (1875) and Regulations.

Among other instances of international coöperative efforts to regulate radio communication are: The International Convention on Safety of Life at Sea, signed at London, in 1914, embracing provisions relative to radio equipment on vessels, which was not ratified by the United States; the resolution adopted by the Conference on the Limitation of Armament, at Washington, in 1922, for the regulation of radio communication between China and other countries; the pending treaty between the United States and Panama, signed December 9, 1926; the protocol between the United States and Italy, dated March 27, 1918; the project of convention prepared at a meeting of the Inter-American Committee on Electrical Communications, in Mexico

RULES OF WARFARE AFFECTING RADIO AND AIRCRAFT

The proceedings of the International Commission of Jurists and their Military and Naval Advisors, which met at The Hague, 1922–1923, for the purpose of formulating a code of rules for the regulation of the use of aircraft and of radio in time of war, are noteworthy.

The Commission, composed of delegations of the United States, the British Empire, France, Italy, Japan and The Netherlands, under the presidency of John Bassett Moore, first American delegate, was convoked in pursuance of a resolution adopted by the Conference on the Limitation of Armament at Washington, February 4, 1922, providing for the appointment of a commission to consider and report upon the two following questions:

(a) Do existing rules of international law adequately cover new methods of attack or defense resulting from the introduction or development, since The Hague Conference of 1907, of new agencies of warfare?

(b) If not, what changes in the existing rules ought to be adopted in consequence thereof as a part of the law of nations?

The American delegation was successful in urging the adoption, in the declarations of the Conference, of the fundamental principle of distinguishing between combatants and non-combatants and protecting non-combatants against injuries not incidental to military operations against combatants.

The Commission prepared two sets of rules of warfare, one applicable to radio, and the other to aircraft. A proposal made by the United States for entering into a treaty to make the rules obligatory has not yet met with general acceptance.

TERRITORIAL LIMITS OF NATIONAL JURISDICTION OVER MARGINAL WATER

The traditional advocacy by the United States of the principle of the freedom of the seas justifies reference to what may seem to be a relaxation of its observance in the efforts of the United States to suppress traffic in intoxicating liquors.

The extent of the marginal sea is commonly regarded as determined by international law. The three-mile limit, or marine league, laid down originally because it represented cannon range at that time, has continued to be observed by the great majority of states, including the United States, even though the range of modern artillery is much greater.

The most recent instances, furnished in the numerous conventions concluded between the United States and various countries for the prevention of smuggling of intoxicating liquors, tend to confirm the rule. Where reference is made in such conventions to any definite extent of marginal sea, it is declared that it is the firm intention of the high contracting parties "to uphold the principle that three marine miles extending from the coastline outwards and measured from low-water mark constitute the proper limits of territorial waters." But the conventions contain an article in which the other contracting state agrees to "raise no objection" to searches and seizures of private vessels under its flag by United States authorities, outside United States territorial waters, whenever there is "reasonable cause for belief that the vessel has committed an of-

City, in 1924, for submission to the Sixth Pan American Conference at Havana, in January, 1928, which, because it combined both wire and radio communication, was not approved by the United States delegates, who favored separate conventions dealing with each subject alone.

fense against the laws of the United States, its territory or possessions prohibiting the importation of alcoholic beverages." The rights conferred by this article are not to be exercised at a greater distance from the coast of the United States than "can be traversed in one hour by the vessel suspected of endeavoring to commit the offense." If the liquor is intended to be conveyed to the United States by another vessel than the one boarded and searched, "it shall be the speed of such other vessel and not the speed of the vessel boarded, which shall determine the distance from the coast at which the right under this article can be exercised."

The Supreme Court of the United States has held that the Constitutional amendment and the subordinate statutes are operative in all territorial waters, including the marginal seas to the three-mile limit,[3] but that such treaty created no offense against the laws of the United States.[4]

Notwithstanding contrariety of opinion, the clear weight of judicial authority now is that these liquor treaties are not self-executing.[5] In the last-cited case, the Circuit Court of Appeals for the Fifth Circuit said that "the treaty relied upon does not attempt to extend the criminal laws of the United States beyond the three-mile limit."

PROGRESSIVE CODIFICATION OF INTERNATIONAL LAW

The prevailing conception of this most important effort to promote the science of international law was expressed by Charles E. Hughes, in an address delivered in 1925, as follows:

> We are thinking both of the restatement of the existing law and of the process of international legislation; that is, of reinvigorating the old law by fresh declaration and of obtaining the formulation of principles and rules which will settle old juristic controversies and also meet the demands of new conditions.

Codification of international law had pursued the gamut of proposals, early in the nineteenth century, by James Mill and Jeremy Bentham; of partial codes by Lieber, Bluntschli and Field; of study and discussion by international law organizations; of digests and textbooks by publicists, and various general treaties and conventions dealing with particular subjects.

The task did not, however, attain authority until commissions began to function under the direction of the League of Nations (meeting of 1924) and the Fifth Pan American Conference (of 1923). Since then great strides have been made in the direction of progressive and gradual codification.

COMMITTEE OF EXPERTS APPOINTED BY THE LEAGUE OF NATIONS

The Advisory Committee of Jurists assembled at The Hague to draft a plan for a Permanent Court of International Justice recommended that a new conference of the nations in continuation of the first conferences at The Hague be held as soon as practicable for the purpose, among others, of codifying international law. The proposal for this recommendation was made by Elihu Root, a member of the Committee, who felt the incompleteness of any plan for a tribunal which did not contemplate an agreement upon the law of nations and which should not provide for conferences of the nations in order to agree upon such further rules of conduct as international

[3] See *Grogan* v. *Walker & Sons* [1922], 259 U. S. 80; *Cunard Steamship Co.* v. *Mellon* [1923], 262 U. S. 100.

[4] *Ford* v. *United States* [1927], 274 U. S.; 47 Sup. Ct. 531.

[5] *The Over the Top* [1925], D. C.: 5 Fed. 2nd 838; *The Panama* [1925], D. C.: 6 Fed. 2nd 326; *The Sagatind* [1926], C. C. A. 2nd Circuit: 11 Fed. 2nd 673; *Hennings* v. *United States* [1926], C. C. A. 5th Circuit: 13 Fed. 2nd 75.

conditions should from time to time suggest or permit.

The time for action by the League was not then opportune, especially as Great Britain did not at first favor the recommendation. But later, upon the proposal of the Swedish delegation, the Fifth Assembly of the League, on September 22, 1924, adopted a unanimous resolution requesting the Council to convene a Committee of Experts, representative of the main forms of civilization and the principal legal systems of the world. This Committee was to be charged with the duty, among others,

> To prepare a provisional list of the subjects of international law, the regulation of which by international agreement would seem to be most desirable and realizable at the present moment; and
>
> To report to the Council on the questions which are sufficiently ripe and on the procedure which might be followed with a view to preparing eventually for conferences for their solution.

Such a Committee of Experts was, accordingly, appointed by the Council of the League of Nations, at its 32nd session in Rome, in December, 1924. Following a second meeting at Geneva, January 12–29, 1926, the Committee addressed, through the Secretary-General of the League, to the governments of countries, whether members of the League or not, communications embodying a provisional list of the subjects of international law the regulation of which by international agreement seemed to the Committee to be most desirable and realizable at the present moment. These subjects relate to: (1) Nationality; (2) Territorial waters; (3) Diplomatic privileges and immunities; (4) Responsibility of states in respect of injuries caused in their territory to the person or property of foreigners; (5) Procedure of international conferences and procedure for the conclusion and drafting of treaties; (6) Piracy, and (7) Exploitation of the products of the sea.

The majority of the replies from some thirty governments, including the United States, laid before the Committee of Experts at its third annual session, held at Geneva, March 22–April 2, 1927, were encouraging to the Committee's view of the desirability and feasibility of agreement upon the subjects listed provisionally. At the same session, the Committee determined to recommend to the governments the following additional subjects as ripe for international agreement, viz.: (1) Communication of judicial and extrajudicial acts and letters rogatory in penal matters; (2) Legal position and functions of consuls; (3) Revision of the classification of diplomatic agents, and (4) Jurisdiction of courts over foreign states.

At the eighth ordinary session of the Assembly of the League of Nations, September, 1927, to which the subject had been referred by the 45th session of the Council, in the preceding June, the work of the Committee of Experts was examined, and the Assembly decided, among other things, (1) to summon the first Codification Conference, and to arrange for its preparation and convocation, it being considered that such a conference might be held in 1929, at The Hague; (2) to invite the Committee of Experts to complete its work, and (3) to submit to such first conference, for examination, the questions of (a) Nationality; (b) Territorial Waters, and (c) Responsibility of States for damages done in their territory to the persons or property of foreigners.

PAN AMERICAN CODIFICATION OF INTERNATIONAL LAW

The official initiative for the comprehensive codification of international

law was furnished by the Americas. The First International Conference of the American Republics, held at Washington, 1889–1890, upon the suggestion of Secretary of State James G. Blaine, was born of the idea of the maintenance of peace through arbitration. At the Second International Conference of the American Republics, held at Mexico City, 1901–1902, the members felt that arbitration and peaceful settlement would require an agreement upon the principles of law to be observed and applied, and they, therefore, took up seriously the codification of the law of nations. They adopted a convention for the appointment of a committee of five American and two European jurists to draft, in the interval between the second and third conferences, codes of public and private international law for the American Republics. The convention was not ratified. But, at the Third Pan American Conference, at Rio de Janeiro, 1906, a convention was again adopted and later ratified, which provided for a commission on codification of both private and public international law, the result of whose labors were to be presented to the Fourth Pan American Conference. The committee appointed under this convention did not meet until 1912, and the World War frustrated its efforts.

The League of Nations having failed, at the outset, to take favorable action for the convocation of an international conference for the purpose of codifying international law, the Fifth Pan American Conference, 1923, renewed the consideration of the subject, and again assumed the official initiative. The Conference adopted a report by Alejandro Alvarez, containing projects as the basis of codification to be undertaken by a Commission of jurists of the American Republics, to meet in Rio de Janeiro. Upon the invitation of the Governing Board of the Pan American Union, the American Institute of International Law approved thirty projects of conventions.

On March 2, 1925, Secretary of State Hughes, as Chairman of the Governing Board of the Pan American Union, laid before that body the thirty projects of conventions dealing with the most important topics of the international law of peace, prepared by the American Institute of International Law. He declared:

> I believe that this day, with the submission of concrete proposals which take the question of the development of international law out of mere amiable aspiration, marks a definite step in the progress of civilization and the promotion of peace, and for that reason will long be remembered.

The Institute also approved a code of private international law, consisting of 435 articles, which had been drafted by Antonio S. Bustamante, of Cuba. When this code was submitted by Secretary of State Kellogg to the Governing Board of the Pan American Union on February 3, 1926, he observed that:

> In spite of any differences of opinion that may develop relative to basic principles or to details, the preparation of these drafts of conventions marks an important step forward in international relations.

MEETING OF INTERNATIONAL COMMISSION OF AMERICAN JURISTS

An International Commission of American Jurists for the Codification of International Law, Public and Private, met in Rio de Janeiro, April 18–May 20, 1927, to consider the thirty projects of public international law and the code of private international law transmitted by the Governing Board of the Pan American Union to the twenty-one American states. Only seventeen states appointed delegates.

This Commission constitutes, accord-

ing to Dr. James Brown Scott, one of the two American delegates, "the first official body which successfully and consciously endeavored to codify the two branches of international law." It adopted twelve projects of public international law, and a code of private international law embracing 439 articles, which were recommended for the consideration of the Sixth Pan American Conference, to be held in Havana, January, 1928.

The projects of conventions thus adopted relate to: (1) The bases of international law; (2) States—their existence, equality, recognition; (3) Aliens; (4) Treaties; (5) Official publications; (6) Interchange of professors and students; (7) Diplomatic agents; (8) Consuls; (9) Maritime neutrality; (10) Asylum; (11) Duties of states in case of civil war, and (12) Pacific settlement.

It may be questioned whether it is now necessary or advisable for the Pan American States to overlap the labors of the Committee of Experts and the League of Nations, in which most of the governments, including the United States, have been coöperating. Undoubtedly they could make constructive contributions, supplementing the more general undertaking of the League of Nations.

THE PERMANENT COURT OF INTERNATIONAL JUSTICE

The history of the establishment of this Court has often been narrated. Article 14 of the Covenant of the League of Nations provided for the establishment of a court of international justice. In fulfilment of this provision, the Council of the League on February 13, 1920, appointed an Advisory Committee of Jurists to formulate the scheme of the court's organization, which later submitted a draft statute. After the draft was communicated to the government members of the League, approval was given by the Council, at Brussels, on October 20–28, 1920, and by the Assembly, at Geneva, December 13, 1920. The Second Assembly and the Council of the League of Nations on September 14–15, 1921, proceeded to the election of the eleven judges and the four deputy judges of the Court, and elected John Bassett Moore, the eminent American publicist and lawyer, as one of the judges.

The efforts to secure the adherence of the United States to the Protocol of Signature to the Statute for the Permanent Court of International Justice have been involved in controversy too extended for review here. The acceptance of the reservations adopted by the United States Senate in its resolution of January 27, 1926, authorizing adherence, having been qualified, in respect to some of the reservations, by the signatory powers at a meeting held in Geneva, in September, 1926, the President of the United States announced that he would not resubmit the matter to the Senate, and it has since been held in an impasse.

Between July, 1922, and October, 1927, the Permanent Court of International Justice rendered ten judgments and thirteen advisory opinions. The *judgments* dealt with navigation of the Kiel Canal; jurisdiction of the Court over a case brought by Greece against Great Britain under the mandate for Palestine; claims against Bulgaria under the Treaty of Neuilly; refusal to grant an interpretation of a previous judgment when it would go beyond the limits of the judgment itself; concessions in Palestine over which the British Government is a mandatory; legality of certain expropriations made by Poland; German interests in Polish Upper Silesia, and penal cognizance of a collision at sea. The *advisory opinions* included questions

regarding selection of delegates to the International Labor Conference; competence of the International Labor Organization; British-French dispute over nationality decrees in Tunis and Morocco; prejudgment of a dispute with reference to the execution of treaty provisions; Poland's international obligations toward German colonials under the Minorities Treaty; acquisition of Polish nationality by German settlers; decision by the Conference of Ambassadors with reference to a boundary dispute between Poland and Czechoslovakia; mission contemplated with respect to the frontier between Albania and the Kingdom of the Serbs, Croats, and Slovenes; exchange of populations between Greece and Turkey; Polish postal service in the Port of Danzig; decision by the Council of disputes under Article III of the Treaty of Lausanne, and competence of the International Labor Organization.

While the judgments and opinions of this tribunal have been carefully confined to the particular questions before it, they are not without the great force of their authority and the Court is building up a body of precedents which will greatly enrich international jurisprudence.

POST-WAR PROGRESS IN INTERNATIONAL ARBITRATION

In the first 1000 treaty series registered with the League of Nations and published since July 5, 1920, more than 180 bilateral compromisory clauses containing agreements to arbitrate are included. Infrequent before the war, a compromisory clause has been inserted in all of the rather numerous multilateral conventions on specific subjects since 1920. The several collective general agreements for arbitral methods of avoiding or preventing conflicts have the same effect as very numerous bilateral treaties. Ninety bilateral treaties for arbitration or conciliation, made since the war, employed several formulae, representing a great improvement upon those generally employed before the war. It may be specially noted that the pre-war exception of national honor and vital interest has practically ceased except in American and British arbitration treaties.

LIMITATION OF ARMAMENTS—OUTLAWRY OF WAR

The bounds of space do not permit a review here of such episodes as the Conferences for Limitation of Naval Armaments, held at Washington, in 1922, and at Geneva, in 1927; the Conference of Locarno, held in 1925; the Geneva protocol adopted by the Assembly of the League of Nations, and the proposals for the "outlawry" of war or the "renunciation" of war as a national policy. Whether fruitful or inconclusive, they are not only of signal and far-reaching importance in relation to international diplomacy, but they are highly significant in offering solution of problems which many regard as primary and legal.

The abolition of war as a legal status in international law would throw into discard many laws not only of belligerency but of neutrality. The prospects of proposals in this direction, at best speculative, obviously depend upon their multilateral adoption.

CONCLUSION

During the period under review, the development of international law has proceeded systematically and progressively, covering the substantive part as well as the processes of application. The advancement made, while conservatively viewed as still in the inceptive stages, is nevertheless unprecedented in magnitude. The diffi-

culties which have tormented peoples and the problems which have vexed their statesmen have naturally had their reaction in the seeming failure of various concerted efforts. Temporary setbacks are not a true test of the practicality, or the possibility of success, of movements which are idealistic in goal. Between total failure and complete realization of an ideal there is much room for practical compromise. That happy medium has, indeed, characterized the history of the aspirations of the United States.

Some Reflections on Solving Social Problems by Law

By THEODORE A. JOHNSON
Youngstown, Ohio

IF what can be done by law is to be measured by the number and kinds of laws proposed and enacted, we have only to extend the arms of law until they cover the entire field of human thought and endeavor, and evil will flee and problems, social and political, be no more. If there be laws enough the unruly and unwelcome guest known as human imperfection, leading us into disease, disorder, and damnation, will make his speedy exit. So far has the chase for new laws gone, that search is being made of the records of civilizations, old and new, for regulations yet unknown to us. If a European country has, or had, a law which we do not have, that is sufficient reason for adding it to our tumbled collection of laws.

The failure of law, now here and now there, to do what was expected of it has not slackened the pace of law making. In the case of every new reform measure, we never fail to receive wonderful figures on the results obtained. These figures are generally collected by the same hands which administer the measure, and that leaves abundant room for self deception. The figures usually show what they are expected to show. But the common fate of all these splendid results has always been that they dwindle down, and many of them turn into a negative quantity. The reason is, and will continue to be the same, namely, that legislators have no adequate knowledge of human nature, individual or associated. This accounts for the superficial character, if nothing more, of the measures which are taken, and which do not so much as touch the roots of disorder. Hence the inevitable disillusion, following quickly after the birth of a new device.

And the fact that in many cases laws have not only failed to do what they were set to do, and have instead created new and worse evils than those they were intended to destroy, goes unnoticed by all save a few students of government and society. These few are now protesting against the "rain of law." A ray of hope is seen in their revolt. It is reassuring to know that a few people believe that liberty for the individual is essential to human progress.

These rebels, among whom is the writer, concede that the ever increasing complexity of society, the number and size of cities, the progress of knowledge and invention, the vastness of industrial organizations, and changes in moral evaluation make necessary more and more intervention on the part of the state. They believe, however, that these changes require increasing knowledge, experience, deliberation and caution in council and legislative halls. They believe that "a certain amount of overt confusion and irregularity" will be present wherever there is enough freedom to enable individual capacity to find itself. They believe that progress is possible and society stable "only when all its members can function to the limits of their capacity." They believe, too, that the danger at present lies in the direction of too much regulation and restriction, of attempting to do by law what it cannot do, and leaving imperfectly done, or wholly undone, what it can and ought to do. And they are ready to give some reasons for the faith that is in them.

THE ESSENTIAL SAMENESS OF NATURE AND HUMAN NATURE

These reasons arise out of their view of nature and of human nature and out of the limitations existing in man and man's law to do and make what he wants to do and wants to make. Man's physical surroundings change not at all, and their molding influence upon him is constant. These are beyond the control of any law given to man to make. Says Irwin Edman:

> Throughout the long enterprise of civilization in which mankind have more or less consciously changed the world they found into one more in conformity with their desires, two factors have remained constant: (1) the physical order of the universe, which we commonly call Nature, and (2) the native biological equipment of man, commonly called human nature. Both of these, we are almost unanimously assured by science, have remained essentially the same from the dawn of history to the present.

The physical order of the universe, though ever essentially the same, forms no insurmountable barriers to man's efforts to move forward. He must do his moving, however, in a world composed of earth, sea, sky, soil, climate and seasons even as Adam and Eve. To destroy the effect of these upon himself is not in the power of man. He may, if he has the required courage and skill, bring forth inventions which control nature's forces and subdue them, in a large measure, to social uses, but he cannot prevent sea and soil and mountain and climate from leaving unmistakable traces in human character. Legislators who do not respect the ways of nature's God find themselves overruled by a tribunal whose decisions are not subject to recall.

The second constant factor is human nature. Let authority be heard. Charles A. Ellwood:

> We have given up the idea that the mind of the very first man was fundamentally different in its powers from ours. If it had not had qualitatively the same powers and capacities as our own minds, it would never have developed into the present human mind. Ralph R. Inge:
>
> Apart from the accumulation of knowledge and experience, which are external and precarious acquisitions, there is no proof that we have changed much since the first stone age.
>
> Pierre de Tourtoulon:
>
> The conformation of the human brain creates inescapable, that is, necessary modes of thinking among all men, so that one may conceive of certain social principles which are imposed by the fact that men of yesterday, today and tomorrow will always be, to a certain extent, similar beings, intellectually and emotionally.
>
> Irwin Edman:
>
> It is too often forgotten that the problems which are to be dealt with in the world of politics, of business, of law, and of education, are much complicated by the fact that human beings are so constituted that given certain situations, they will do certain things in certain inevitable ways. These problems are much clarified by knowing what these fundamental ways of men are.

The laws which govern man himself are quite as constant as those of physics and chemistry.

The unruly part of mankind, the part which concerns reformers, is made up of emotion and instinct. And it is certain that emotion and instinct in the human race have not changed much "since Pithecanthropus dropped the first half of his name." The Middle Ages found out that the sex instinct could not be suppressed. Cromwell found out that emotions and instincts pushing and driving toward amusement and pleasure, repressed too far by law, would cause an explosion which scattered to the winds his religion of tyranny. Volstead and Wheeler found out that men who grow grapes will drink their juice even though it is

more than six weeks old and has undergone a chemical change. And statesmen of all ages find out that customs, usages and laws are successful only when they yield obedience to the fundamental facts of human nature, that they must not strive too strenuously to reach the ideal, that they must not strain human nature too much out of its inherited form, that wholesome remolding of character can go on but slowly.

Nature, human nature and society comprise together a constitution of things. It was not wholly in error that the advocates of natural law and natural rights wrote and spoke. There may be, in the old sense, no such laws and rights. But there is a constitution of things which intelligent men respect and which law makers ought to respect. If there is no constitution of things, why do men thrive on a diet of bread and die on a diet of carpet tacks? If there is no constitution of things, why do torture and anguish, severe and unceasing, destroy any mind? If there is no constitution of things, why do some laws work beneficently and others disastrously? Is it because some laws fit and others misfit? Why the fit or the misfit? "If one law is not as good as another, it must be that on men socially aggregated one law will operate more beneficially than another, and its more beneficial operation implies some adaptation to the natures of men and their mode of coöperation." Legislators should not legislate extensively without having sufficient knowledge of the constitution of things, and if they have such knowledge they will not legislate extensively.

LEADERS ESSENTIAL AS LEGISLATURES

Law is one of the devices which society uses to regulate human conduct and to promote those types of it which to the passing day seem desirable. Its limitations are evident. It cannot change nature. It cannot perceptibly change human nature. It cannot alter the effect of nature on human nature. It cannot enforce itself. It is necessarily imperfect because it is made by finite and imperfect human beings. The stream rises no higher than its source.

And the source of law in the United States is the polling booth and the ballot box. Out of these can come only the wisdom which went into them. The product of the wisdom thus going in and coming out is the member of the legislature. Has he been educated for his task? Has he the knowledge and experience essential to the job of curing social disease? Does he know psychology, political science, economics, and government? Does he know the structure of society? Does he possess an understanding of what constitutes social development? Does he have a comprehension of how changes in the common life are caused, and how these changes are related to each other?

Any one can be a legislator. He cannot be a barber without some special training. He cannot be a mason or a plumber without having served a long apprenticeship. He cannot be a teacher, a minister, a lawyer, or a physician without a general education and a special training of years. But a man who today is a street-railway conductor without capacity to manage *one* farm or *one* factory or *one* bank or *one* railroad or *one* school is tomorrow elected a member of the legislature, and over night he has acquired capacity to manage by law *all* the farms, factories, banks, railroads, and schools in a great State. Considering the limitations of law and what these capable legislators try to do with it, do you wonder that legislation is ever breaking down? Are you surprised to learn that amendment and repeal form half the business of every session? If

you were on the quest of a vast mass of prosaic nonsense in print, could you do better than to go first to the statutes of your own State?

Democracy will choose for its various officers those with whom it is acquainted, with whom it has some personal contact, with whom it shares ideals. And if those who can lead and ought to lead in any community persist in delegating their duties to paid workers, they need not expect reason and justice to reign in matters political. Leadership in a democracy must be forced by the very presence and energy of leaders in every community activity. Leadership may be conceived in a mansion, born in a university or the directors' room of a chamber of commerce, but it must roam about if it is ever to reach its majority.

Our early fathers and their immediate descendants, having been first on the spot, demanded that they be regarded as the legitimate masters of the newly founded empire. Their language and their ideals were accepted by all who settled within their domains. They exercised leadership, and they knew their business. Others obeyed them because it seemed the most reasonable thing to do. And when occasion came to amend the articles of government, they made a new constitution and forced the people to adopt it by the use of sound argument and customary political methods. Having gone this far, they managed for twenty-five years to control and form the policies of government. They filled the offices of President, Congress and the Courts. It was they who made the laws and executed them. They collected taxes, raised the army, and quelled insurrection. They made their new constitution an instrument of service and of power.

The more remote descendants of these vigorous and independent founders of America, forming now only a despised minority, have lost this delicate gift of leadership and are content to sit back and invest their surplus funds and construct genealogies, and let others do the real work. And an inexorable law of nature has wrested from them the leadership they did not value enough to work for and transferred it to feebler hands.

One step toward a better day can be made by sending out a call to the nobility of the United States to cease hibernating in exclusive clubs or gamboling upon exclusive greens and become the most nearly omnipresent part of their community; to cease buying some one else to do their common service while they sit serenely in counting house or club, safe from the dangers of human contact. Neither a substitute nor a banker's check can carry the employer's or maker's dignity, mentality, wisdom and strength of character. That is why paid hirelings cannot anywhere do the work of the nobility. So while it is impossible, and perhaps undesirable, to get rid of legislators much may be done to improve the breed.

With an improved legislature it should be possible to have a division of labor. A social problem is up for solution. Any proposed measure will raise two questions: (1) what can be done by law, and (2) what of the possible ought to be undertaken. The first is a job for experts. They will be chosen from jurists, endowed with mentality capable of analysis and synthesis, who know all the possible legal relations which may be involved. These experts make no recommendation. They merely set out the various solutions that the system of law offers for the work about to be attempted. The second is for legislators proper. They come from all walks of life and know the temper of their constituents. They can apply

their practical knowledge, call for expressions of opinion, hold hearings, find out whether the proposed measure has been tried elsewhere, and generally investigate and weigh the matter.

LEGISLATURE AND SCIENCE

After the legislature, so composed, decides that a solution of the problem ought to be attempted and that a certain proposal is the most reasonable, this proposal can be tested by the various sciences. By psychology. Is there to support it a real, deep-seated and legitimate sentiment? Or, will it run counter to such a sentiment? By politics. Would it be dangerous to promulgate it? That is to say, would the cost in money, or in confusion, or in antagonisms aroused more than balance any good reasonably to be expected to ensue? By economics. Will it aid or hinder citizens in their pursuit of wealth? Will it take substance from one class and bestow it upon another class? By the juridical system. Is it fair to all classes? Does it claim a special privilege for any class? Does it place a special burden on any class? Does it unreasonably interfere with the liberty of the individual? Is there any means of enforcing it? These queries in some form should be continued until every human interest has been asked for an answer.

If there is created such a division of labor as here suggested, the same mind would not be obliged to engage in two tasks which are foreign and prejudicial to each other. The theorist has spent his life in research. He thinks in terms of theory. He is likely to press a claim for a beautiful bit of logic. The legislator proper comes from a career of activity in business, or trade, or profession. His thinking has been for the most part in line with his calling. He is not an expert in jurisprudence. He is likely to become so much absorbed in one extreme proposal that he overlooks other proposals which might meet better the exigencies of the situation. The legislature, therefore, should consist of two parts, one for possible solutions and the other for practical solutions.

SOCIAL LEGISLATION

Social problems usually contain questions of morality, the right or wrong, the good or evil effects of certain conduct. Law is rule, or can be digested into rules. Morality is not rule and cannot be digested into rules. No rule can be so universal as to demand, always and everywhere, any man's submission. "Thou shalt not kill" is a command, a rule if you please, but the human race has found so far no way to give it unbroken obedience. Self-defense is a lawful defense and a moral defense. It would be a moral defense even though it was not a lawful defense. So law can make wrong nothing which is intrinsically right and nothing right which is intrinsically wrong. Law cannot sanctify murder or make wrong, under all circumstances, singing or dancing. This incapacity of law explains, in part at least, why the morality of laws is such an inconsistent thing. Law says it is wrong to transport, and right to exhibit, pictures of a prize fight. One may save his own life by killing his assailant. One may not even attempt, without legal permission, to save his own life by taking a little wine for his infirmities. Moral permission is his alike in both cases. Hence the confusion and disobedience now in our midst because of certain recent legislation.

"It is an old wish," wrote Immanuel Kant, "which may (who knows how late!) perhaps sometime be fulfilled, that instead of the infinite multiplicity of civil laws, we may at last find out their principles." If one were to read all the statutes made and provided in

the United States during the last hundred years, he would find a paucity of evidence indicating that legislators had found out these principles. They are even now but dimly seen by the wisest of men. It may be that by a more prolonged research into social causes and effects we shall discover these principles nearly enough to enable us to say with reasonable certainty what will be the effect on life, individual and collective, of any law. Situated as we are now we cannot say with any degree of accuracy what amount of evil has been prevented by law. Still less accurately can we estimate the amount of good which has been procured or prevented by law. We are therefore compelled to experiment if we legislate at all. And resort to experiment we shall, because democracy is too impatient, too benevolent, and too fond of power to see society developing naturally and sloughing off evil slowly in the process.

Fortunately for us government in America is both State and National. Where a desired experiment is either too costly or too risky to justify a national law, we can make it in one State; likewise with a wholly new adventure in legislation. Besides permitting us to escape most of the ill effects of mischievous legislation, this method affords us opportunity to observe what happens both where the law obtains and in similar places where it does not obtain. This is the only way we can clearly see what changes are effected by the new measure. For, if it is extended over the Nation, its effects will be merged into the mass of multifarious effects and thereby become undiscernible.

If there is nothing more to be learned concerning marriage and divorce, education, child labor, punishment of criminals, prevention of crime, suppression of vice, the use of intoxicating beverages, and other social problems, the National Government might well deal with them all by National laws. No one claims, however, that perfection of knowledge in this respect has been reached. No one disputes that, with present knowledge, experience is a valuable teacher. How, then, can we do better than to leave to the States the major part of legislation in respect to these problems? For it is certain that we can learn more of the effect of law on crime, for example, by observing the laws of the States, than we could if there were only one Federal law.

Any person who takes an impersonal view of the matter can scarcely fail to see that since man has for centuries struggled with these problems, and since the men of today are only a little way in advance of the men of yesterday, there should be no wide gap between the social legislation of yesterday and the social legislation of today touching matters of personal conduct. The most that can be done is to contemplate the ramified consequences that laws have produced in times past and are producing now, carry on investigation, increase our knowledge and make experiments, meantime exercising patience and tolerance.

Conciliation—A Cure for the Law's Delay

By Edgar J. Lauer
Justice of the Municipal Court of the City of New York

WE hear and read much of the law's delay. We have heard and read much on the same subject for many years past. The delay in the administration of the law still remains. However, we need not look with discouragement upon this condition. We have always had defects and weaknesses in our judicial structure. This must always continue to be so. The ideal is always just ahead. We can and must correct the deficiencies which now are apparent to us. New defects and weaknesses will appear, undoubtedly, as time progresses. These in turn will need attention and will find a cure. Unquestionably the delay presently existing in the disposition of litigated cases is due to the congested condition of the calendars of our courts in the large centers of population. The purpose of the present article is not to account for the large volume of litigated cases on the calendars of our courts, but rather to propose a remedy.

Delay in the disposition of litigation is frequently equivalent to a denial of justice. This is particularly the case with the poor litigant and one with limited means. We must see that there is no denial of justice in our court procedure and especially not to the poor litigant. "The inevitable effect of the delays incident to the machinery now required in the settlement of controversies in judicial tribunals," said Chief Justice Taft, "is to oppress and put at a disadvantage the poor litigant and give advantage to his wealthy opponent." And the Chief Justice continued: "Courts and legislatures could devote themselves to no higher purpose than the elimination from the present system of those of its provisions which tend to prolong the time in which judicial controversies are disposed of."

"Justice is the greatest interest of mankind on earth," said Daniel Webster. If the law's delay means a denial of justice, to what better or higher purpose can we devote ourselves than to find a remedy for this delay.

Conciliation Supplies the Remedy

I believe that *conciliation* supplies this remedy. Every litigated case that is conciliated, that is, where the parties reach an amicable adjustment of their differences, represents one less case which requires a trial and saves the court and jury the time which would be consumed by a trial.

Conciliation, therefore, should be encouraged and made an integral part of the administration of justice in our courts. It should have a place at least equal to the trial as a means of terminating the litigation.

By conciliation I mean any process by which the differences of parties are eliminated by agreement of the parties themselves and the parties brought into harmony. This harmony may be accomplished either by the efforts of the parties themselves or through the efforts of a third party. Conciliation is not arbitration and should not be confused with it. In arbitration the dispute of the parties is left for decision to some third party by agreement of the parties to the dispute, whereas in conciliation the parties themselves agree upon a solution or adjustment of the dispute. The decision in arbitra-

tion may be pleasing to one but most displeasing to the other of the disputants, or it may be displeasing to both. In conciliation the decision must be satisfactory to both disputants since it depends upon their voluntary action.

An action or proceeding in court is commenced to secure a right or redress a wrong which the party starting the litigation could not secure by amicable means. In other words, the party who appeals to the court for redress is seeking to force the party who is haled to court to do something contrary to his will or wish. It is then a fight and progresses as such to the conclusion of the litigation after a trial. The trial is the battle, the test of strength of the contending parties. This battle of the trial is fought out by generals—the lawyers for the contestants. People who fight are apt to get hurt, no matter how they fight. It is so with litigants. The fight is usually costly in time, money and effort, and besides is an economic waste, if I may use that expression. Unfortunately a fight once started is likely to proceed to a final determination unless some third party interposes his good offices as mediator or conciliator. Here then is the opportunity of the court. If with reasonable or proper effort the fight can be stopped, it should be. It is the duty of the court, as I see that duty, to stop the fight if possible before the fighters are seriously hurt. This can be attempted by an effort to adjust the dispute or differences of the contending parties.

POINTS TOWARD ACCOMPLISHMENT

The question naturally arises, "How do you propose to accomplish this effort at conciliation?" My answer is this: As a *first* effort—in every case in court where the parties appear by attorneys I should require the attorneys to confer and make the effort on their clients' behalf to adjust the dispute. I should not permit a trial to take place until after this effort at conciliation has been made. The effort at conciliation by the attorneys, the duly accredited representatives of the parties, should be a preliminary prerequisite to a trial.

A rule should be enacted in every court where trials occur requiring that before causes are noticed for trial by attorneys a genuine effort at conciliation be made and before a cause is placed on the calendar of the court for trial the rule should require the filing of an affidavit containing proof of the making of the effort and the failure of the effort to accomplish results. Of course if the attorney for one of the parties should refuse to meet in conference or decline to talk settlement of the dispute, the effort at conciliation necessarily must fail and the other party must be permitted to proceed with the litigation.

The very existence of a rule requiring an effort at conciliation will have a beneficial effect in bringing about settlement of disputes. Without a rule of this nature, the litigation once started is apt to continue as a litigation to the end. People follow the road of least resistance. An effort at conciliation is a diversion from the natural course of a litigation. It therefore requires something by way of suggestion to invite or encourage the effort. The force of the suggestion will, I doubt not, be considerable and the requirement of the rule making necessary the effort will add greatly to the force of the suggestion.

The litigation having started goes its natural way to a trial. This lack of effort to bring about a conciliation may result either because attorneys in a busy community are too much occupied with their business affairs to do

other than prepare for trial when the case is about to be reached for trial, or because neither side desires to approach the other lest the effort at conciliation be regarded as a confession of weakness. The fact is that whatever the cause may be, under our present system parties and attorneys frequently come to court to try their case without any effort having been made to bring the parties to an accord. The proposed rule will effect a thorough change in this situation and I believe will work satisfactorily. This forced effort at conciliation through the medium of attorneys has the advantage of the effort through the mediation of the judge, in that no time of the judge is taken from his judicial labors and no time is taken away from trial work. It casts no very great additional burden on attorneys and it may prove the means of saving very considerable time, not only of the attorneys, but of their clients and witnesses as well.

At the recent calendar call of thousands of cases which had accumulated on the calendar of the Supreme Court of New York, in the county of New York, the suggestion of the judges conducting the call resulted in the settlement of many cases by the attorneys. The *New York Times*, speaking editorially on this subject, said:

> Coöperation by the attorneys under this call has been marked and praiseworthy. If it continues, there will be a reasonable prospect of bringing cases to trial a year earlier than if things had been allowed to go on in the old way. This is a real contribution to the administration of justice, for in many ways, if not in all causes, time is of the essence of justice. Postponement often works an injustice which no decision can repair.

Of this same calendar call, Professor Wormser, in an editorial in the *New York Law Journal*, said:

> Practically all that could be done on such a call was to eliminate deadwood and driftwood and to inquire whether there was a willingness to consider conciliation. If the answer was in the negative, or if the representative of the attorneys answering the call stated that authority to consider conciliation was lacking, the effort generally terminated.

Yet even this effort must have been impressive, for the *New York Times* in its news columns of February 1, 1927, stated:

> The most significant feature of yesterday's call of the 8000 cases was the willingness of attorneys and clients to settle their cases when brought before the calendar judge and questioned as to the prospect of agreement.

I stated that this effort by the attorneys should be the *first* effort at conciliation. I do not intend that it should be the only effort. The adjustment of the dispute and the bringing of parties litigant into harmony is far too important to permit the effort to bring about this desired end to fail merely upon the effort of the attorneys, however well directed those efforts are.

As a *second* effort I should invoke the rule-making power of the court to require a judge in the trial court to tender his good offices to bring about an adjustment of differences in each case awaiting trial.

Who better than an impartial judge can offer suggestions for a fair adjustment of differences to contending litigants? Most assuredly litigants will listen more readily to a suggestion for settlement of a dispute, when the suggestion is made by a judge. His suggestions are disinterested and the source is one because of the position of the judge to command the respect of the parties. These suggestions are free from suspicion, which may be entertained when made by a party or his

attorney, and consequently the more readily entertained.

PRACTICAL EXPERIMENTS

My experience on the bench of the Municipal Court for upwards of twenty years leads me to say that I entertain no doubt that conciliation can be made a medium for the speedy disposition of litigation.

I have consistently made it a practice in cases to be tried before me with the aid of a jury to call counsel to the bench before me and interrogate them respecting the nature of the case and the prospect of adjusting differences. I have secured many settlements without the exercise of any pressure on the parties to reach a settlement. Invariably I have received the thanks of attorneys and clients for my efforts, and this even though the attempt at conciliation failed to result in a settlement.

In February, 1925, I made an experiment in my court with the aid of my associates. I asked and obtained the coöperation of the *New York Law Journal,* a daily publication for lawyers, which goes into almost every law office in the city of New York. It was announced for two weeks before the experiment was undertaken that there would be an effort made to conciliate every case marked ready for trial on the day calendars; 163 cases out of 272 were settled and 109 cases were tried. In addition to these 212 cases were settled by the attorneys or parties without the aid of the judges. It would have required at least twice the number of judges to dispose of the cases ready and disposed of had it been necessary to try them all. In this formal experiment the judge who made the effort to conciliate the parties did not try the case where conciliation failed. This was done in order to obviate any fear of bias on the part of parties or their attorneys consequent upon nonsuccess. I regard this feature as important in any plan of conciliation by a judge. It is important that a judge who tries a case be free from any bias or prejudice, and it is likewise important that the belief of litigants in this freedom should remain unimpaired.

There can be no doubt that where litigants are fair-minded and have fair-minded counsel and are desirous of adjusting their differences the settlement of the litigation will follow as a result of a conciliation effort.

Where, however, the dispute is not real or one party seeks delay, there can be no conciliation. In such a case there will be no consent to any procedure which will expedite the disposition of the case. (Report of Committee on Arbitration of New York State Bar Association, dated January 3, 1924.)

By way of illustration of my own experience with conciliation I cite the following examples:

1. A fur dealer sued a dresser of skins, claiming that the latter had ruined his skins by improper use of chemicals in the process of dressing. The dresser denied the dealer's charge and claimed from the dealer the value of the work done in dressing the skins. Upon my inquiry as to what the dispute was about, the fur dealer produced one of the skins treated by the dresser and showed that the hair was falling out. The dresser retorted that this was not his fault, because the animals had not been trapped, as was the usual custom, but shot, which caused the hair to fall out. Each side asserted that experts could be produced to support the statements made. I inquired whether the skins did not have some value and if so, whether the skins could not be sold and the loss divided in some proportion. The dresser at this

point asked to see the skins. Adjournment was taken and the skins were produced the following day. The skins were thereupon examined and a settlement was arranged with the aid of the attorneys. The parties parted as friends, the dealer promising to continue business with the dresser. I devoted about twenty minutes to the adjustment of this case, which would have taken the greater part of a day to try.

2. A landlord sought to dispossess a tenant from a store upon the tenant's failure to pay the rent agreed upon under a lease. The storekeeper asserted that the landlord failed to keep his promises, and that things were being done by the landlord which made it difficult for the tenant to continue his business. After eliciting a brief outline of the nature of the dispute I requested the attorneys with their clients to go into the corridor of the courthouse and see whether a settlement could not be arrived at. They returned in a short time announcing that they had arrived at a settlement and that, in fact, a new lease has been arranged between the parties. This took no more than ten minutes of my time. The case would have taken at least two hours to try.

EFFECTIVENESS OF CONCILIATION

Conciliation as a means of ending disputes is no untried experiment. It has been put to the test in many fields and its success demonstrated. Courts of conciliation were established by the Government of Denmark in the West Indies in 1755, and afterwards in 1795 in Denmark. In Norway also conciliation tribunals were established by law in 1795. In both Norway and Denmark conciliation has been in successful operation. It exists likewise today in France as an essential prerequisite to the institution of an action in law in respect to small claims. In his report as chairman of the Committee on Conciliation of the Conference of Bar Association Delegates made to the Conference in 1926, Mr. Reginald Heber Smith, who has given much thought and consideration to the subject of conciliation, says: "For us in America the experience in Denmark and Norway seems to warrant two conclusions: First, conciliation procedure, properly employed, can be made an invaluable adjunct to the ordinary administration of justice, which is today essentially a litigious method of settling disputes. Second, as a country becomes industrialized and as urban population grows, the function of mediation is better intrusted to the regular judges in the regular courts rather than to special and independent commissions composed of laymen." (See *New York Law Journal*, October 19, 1926.)

As an example of the effectiveness of this method of adjusting disputes it is stated that in Norway seventy-five per cent of the conciliation proceedings begun result in an agreement (*Journal of the American Judicature Society*, Vol. 2, No. 1, p. 8), and in an article by Nicolay Grevstad, in the *Atlantic Monthly* (Vol. 72, p. 671), it appears that in the year 1888 in Norway, according to official statistics, 103,969 proceedings were begun. Of these 2300 were dismissed, leaving 101,669 for disposition. Of these 101,669 cases, 89,901, or nearly nine-tenths of the whole number, were adjusted. In a report made on October 9, 1927, to the Chamber of Commerce of the State of New York, it was stated by the Committee on Arbitration of that organization that of the disputes submitted, "not more than 4 per cent reach formal arbitration." Of the remaining 96 per cent of the cases, the committee is able to reconcile the differences between the

contending parties. (*New York Times*, October 10, 1927.)

In labor disputes, most difficult cases to adjust to the satisfaction of both parties, the conciliation of workers and employees has been demonstrated an effective means of preventing strikes in Canada. Under the Canadian act a conciliation board is appointed for each dispute. A report just published of the working of this act shows that out of 536 disputes, 490 were settled satisfactorily. Strikes were averted or ended in 91 per cent of the cases. (Report on "Postponing Strikes," just published by the Russell Sage Foundation.)

A BROADER VISION OF CONCILIATION

Looking at the subject with a broader vision. We should and must encourage concord rather than discord. In the business world of to-day good will and harmony should hold sway. If we have discord and ill-will among our own people, how may we expect an era of universal peace among the nations of the world. We may not encourage discord at home and expect harmony abroad. If we are to have harmony we must strive for a better understanding among individual disputants. At the recent session of the League of Nations held at Geneva on September 10 last, M. Briand, in an impassioned address advocating peace, said: "Away with rifles, machine guns and cannon! Make way for conciliation and arbitration! Make way for peace!" Let us apply this to our courts, and away with the battle of the trial as a means of terminating a litigation! Make way for conciliation! Let us have peace and good will!

"The law is not in its nature stationary, beyond other sciences. It must change with changing manners, the diffusion of wealth, new channels of industry, and more general intelligence. That which was natural in the Fifteenth Century is uncouth and strange in this. Things which were then convenient are now become intolerable. The knowledge of that day has been multiplied many times. Arts then in their infancy have grown to perfection. In other branches of knowledge, advances are constantly made, the mind searches for new truths, and the search is encouraged. In respect to law, is the rule reversed? Are we then to tread forever in the ways of the past?"

Thus argued the framers of our old Code of Procedure in 1849 when they presented that Code to the Legislature of the State of New York for adoption. It still remains a forceful argument for progress in the law and legal procedure.

I conclude this plea for conciliation as a part in the administration of justice with the concluding sentence of the editorial in the *New York Law Journal* on "The Recent Calendar Call and Conciliation" (*New York Law Journal*, February 16, 1927): "Certainly, conciliation as a conclusion of a litigation is quite as satisfactory as a trial with the ever-present possibilities of expensive and drawn-out appeals."

Why not make the experiment?

Conciliation and Legal Aid an Opportunity for Pioneering

By Reginald Heber Smith
Of the Boston Bar

HUMAN society is composed of groups and individuals whose interests constantly clash, whose desires are continually conflicting, and whose wishes and aspirations are everlastingly at variance. Always this has been so, and as society becomes more industrialized, more commercialized, the points of contact and the occasions for dispute multiply so that every year in the United States there are millions of controversies which in one way or another have to be disposed of by the law and the legal machinery established by the several states and the Federal Government.

With so crushing a burden that already taxes our legal resources beyond their capacity and which threatens to grow worse, one would suppose that every possible legal resource, every feasible method of controlling this flood, would be availed of. But this is not so, and the reason is very hard to find. Logic offers no help. There is no logical reason why a man entering a hard fight should tie one hand behind his back, yet that is what the American state does in its battle to control and deal justly with the multitudinous and multifarious mass of modern litigation.

Human life and the various legal systems devised by man have devised two methods for disposing of controversies. The first is the method of battle and the second is the method of persuasion. Some quarrels between nations are settled by recourse to war, but others are negotiated to an agreed settlement by ambassadors. Some disputes between groups are settled by strikes and lockouts, but others are ended by negotiation and mediation. Differences between individuals may be settled by their fists or more subtle uses of force, or they may be harmonized by mutual concessions.

This second method for handling and disposing of controversies has many variations of form and therefore many names, but the best name, and the one that will be used in this article, is conciliation. Conciliation procedure was known in the ancient law and occupied a definite place in the completed structure of the Roman law. Conciliation procedure is invoked to help dispose of controversies in France, Germany, Norway, and Denmark. Exact and authoritative knowledge does not enable me to go further, but I venture the assertion that conciliation procedure will be found to exist in connection with the administration of justice in practically every civilized country today except England and the United States.

Very recently in the United States we have established a few small claims courts and conciliation tribunals in both of which conciliation procedure is utilized, but with this minor exception the statement is still true that the state has entrusted to the courts only one method for settling controversies and that is the method of litigation.

Conciliation as to Litigation

Litigation started out to supplant warlike measures by supplying a peaceable method, but half-way on its glorious mission it stopped. It grew up in England in order to conserve the King's

peace by putting an end to individuals revenging themselves with their own hands on their enemies. It succeeded quite well, but there it stopped and there it is today. Litigation, as every judge, lawyer, and litigant knows, is a desperate battle. Ordeal by battle was merely changed to ordeal by trial. The physically strong men whom in earlier times each party could put forward as his champion in wager of battle have become mentally keen lawyers who are today put forward by each party as his champion in wager of examination and argument. Cross-examination is now the weapon, and the clash between witness and examiner is one of thrust and parry as in a duel. Such a method and such an atmosphere inflame passions and arouse hatreds. Litigants are seldom ever friends afterwards.

Unfortunately, this litigious method of procedure is the only possible method for some cases, as where the demands of the parties are irreconcilable. It is not the only method for all cases, however, because a large proportion of cases are based on interests that are reconcilable in an honorable way. The tragedy is that our law uses only the one method for all cases and knows no other.

To be concrete. A petition is presented for the custody of a minor child. The facts are that husband and wife have legally separated. Cruelty has bred hatred. Marriage was impossible and the parents must live apart. Both want the child, both love the child, but both cannot have the child. There is an irrepressible conflict and years of litigation may be required to settle it. However unsatisfactory a decision may be, there is no other possible solution. So the petition goes forward in regular course to trial.

Another petition, identical in form, is presented. Here the parties have also parted in anger and a decree of judicial separation has been obtained. But with separation has come loneliness, distance has lent enchantment, dormant love can be rekindled. The wise individual and social solution here is reconciliation, a reunited home, and the dispute over the child disappears as by magic. But let that petition move on to trial, let father and mother stand over against each other seeking to prove the unfitness of the other by dragging out every unworthy act and discreditable conduct, let counsel cross-examine and reopen old wounds as he must do because this is a fight, and you may be assured that the happy solution is gone forever. The embers become dead ashes, anger becomes hate, trifles become mountains, and as they leave the courtroom either can be heard saying, "I would rather die than go back to him (or her)."

Two petitions, objectively alike, both bound to move along the same predestined course, one necessarily and therefore rightly, the other unnecessarily and therefore tragically. Nothing can avoid it except a preliminary effort by the judge at the very beginning to see if perhaps the parties are reconcilable. If this effort is made it will meet stony silence and defeat in the first case, but in the second it will awaken a quick response and will be crowned with success. Our judges do, from time to time, try this very thing; they try conciliation, but it represents an individual *tour de force* by a high-minded judge rather than a definite part of our regular procedure. You may search the statutes in vain and you will find no reference to conciliation.

CONCILIATION NOT STATUTORY IN U. S.

You may go further and search through law encyclopedias and dictionaries and find nothing about concilia-

tion. In "Corpus Juris," so vast a work that with forty-six volumes it is still only half completed, you will find nothing under "Conciliation" but a statement that it is used in France. In Bouvier's Law Dictionary, known to all law school students as a good quick reference book, you will not even find the word.

With these unsatisfactory gleanings from books of law let us look in another field. The index to the *United States Monthly Labor Review* notes conciliation and refers us to Vol. XXII, No. 5, for May, 1926, where anyone can read:

> In the Kingdom of Denmark in the year 1922 more than 75,000 lawsuits were quickly, cheaply, and satisfactorily disposed of by a method of procedure—called conciliation or mediation—that has been successfully employed by the Danish administration of justice for more than a century but which is virtually unknown to us in the United States.

The laws of Denmark which have been in force since 1795 say in effect that in every case every judge of every court shall first try to conciliate the parties. All this means is that before proceeding to litigation the judge in any manner that seems appropriate tries to discover through informal conference with the parties or their lawyers whether the dispute is one that admits of adjustment, and he may indeed suggest an adjustment that seems to him honorable. That this method works, and works in thousands of cases, is attested by the quotation cited above.

QUICK AND CHEAP PROCEDURE

Why this quick, inexpensive, and often successful method of procedure should be ignored by the American system of law is unknown to me. Inquiries addressed to far more learned men than I am, lead me to the conclusion that no one really knows at the present time. We seem to have forgotten all about this ancient and tried method. Only recently have we become fully aware of how successfully other countries are using conciliation in their administration of justice. We may soon know more about America's non-use, because the Legal Aid Work Committee of the American Bar Association is undertaking research work to find out. They are interested because conciliation, being quick and cheap, is of enormous benefit to poor persons. Under conciliation procedure all men are indeed equal before the law. Enough has been learned to indicate that in the early days of the English common law from which our American law is derived there was no frowning on conciliation, because the venerable Lord Chief Justice Coke wrote in his "Institutes": "It is the duty of a good judge to remove causes of litigation." Whether conciliation was used we do not know, but a reference is found in an early report to a "Love-Day" which sounds surprisingly like a court day for conciliation hearings.

AN INHERENT POWER OF THE COURT

Since conciliation is obviously *a method for securing justice,* I believe that its use is an *inherent* power of the court. I cannot cite any decision of the Supreme Court of the United States because no such case has ever arisen, but this is the opinion of Dean Pound of the Harvard Law School, and we do know that the legal heavens have not fallen when a judge here and there has occasionally disposed of a case by conciliation. Elsewhere in this volume Judge Lauer writes of his experiments in New York. I have not seen his article, but I do know that his efforts met with the praise of the bar.

As no reader will permit a writer to state a puzzle and then leave it without at least trying to solve it, I will hazard

the guess that the reason for our failure to use conciliation procedure is psychological. The evidence of it is not altogether clear, but it is suggestive.

We do know that there has been a strong tendency in America to rob the judges of all real power and thus to reduce them to the status of umpires. This move culminated in laws forbidding judges to tell jurors what they (the judges) thought about the witnesses and the facts. This system, in brief, shuts the mouth of the most expert, most impartial person in the whole proceeding. Thus instead of being in affirmative control of the trial the judge finds himself reduced to arbiter when counsel clash and expounder of the law to the jury. To do more is not required and may be dangerous. Some such tendency has resulted in making our judges adopt a passive rather than an affirmative rôle. We know that courts have allowed other inherent powers to slip away from them. Power to control procedure by rules has been defaulted to the legislatures. Power to control admissions to the bar has in some states been defaulted to the legislatures. There has been a democratic tendency to expect the legislatures to pass laws regulating everything. This has not been good for the administration of justice, it has been bad for the courts, and it is taking a mighty effort today to try to restore to the courts those powers which they can best exercise because they are in a position to be more intelligent about the problems than anyone else.

All this may have been in response to a public demand, but on conciliation the public demand has been the other way around, because from 1846 to 1851 the people adopted new constitutions in New York, Wisconsin, California, Michigan, Ohio, and Indiana all of which called for conciliation tribunals. Had tribunals been set up (and they were not) another real power of the courts in the securing of justice would have been taken away and entrusted to new and separate tribunals. But that the people wanted conciliation procedure *used* is clear.

Its use in America must be in the courts and not in separate tribunals. It is a preliminary procedure in a case, not a separate procedure. It should be in the regular court so that if it fails, as it often will, the case can go ahead to trial and without the necessity of being started all over again which is wasteful, expensive and tedious.

The use of conciliation in American courts should be entrusted to the regular judges. This means that it will probably come about gradually. If research shows that there is nothing in our legal history that forbids invoking conciliation, that will encourage the judges. As they learn more about its success in all other countries, the knowledge will inspire them to try. Its use requires skill and tact both of which come largely from experience. As experience grows, there rapidly develops a technique which enables a judge quickly to determine whether he is confronted with a situation in which conciliation is hopeless or one in which there is hope of success; it teaches him how far he may properly go in suggesting possible solutions; above all it brings him into contact with the fine attributes of human nature, the desire to be reasonable and fair and accommodating—factors which are suppressed by litigious methods—so that he comes to perceive and understand those forces which reside in nearly every man's heart and which he must stimulate and encourage in one last supreme effort to bring about an accord before it is too late.

Such a fund of experience is beginning to be built up in the small claims and conciliation courts recently created

with jurisdiction over little cases, generally amounts of $50 or less, and those judges will carry their experience with them as they move up into our trial courts of general jurisdiction.

LEGAL AID UTILIZES CONCILIATION

More important is the fund of experience that the legal aid organizations of the United States have at their disposal. They are considerably older than the small claims courts, they now receive about 150,000 cases a year, their psychology is *against* litigation unless it is absolutely necessary, and in actual fact they are able to care for this vast volume of business only because they do adjust and conciliate a great proportion of the cases entrusted to them. Many of the legal aid attorneys are beautifully adept and skilled in this art; they are flexible and resourceful. They have to be because their plaintiff client is often too poor to litigate, they have no legal power to command or control or even summon the defendant, and yet day after day, in case after case, the legal aid attorneys are conciliating disputes, working out genuine justice, and avoiding all the delays and expenses incident to litigation.

What they can do without authority and power the judges of our courts can do much more easily and effectively. Judges can at least compel the defendant to appear and listen; most persons are entirely willing to assume that the judge is disinterested and fair whereas the legal aid attorney has to overcome the initial handicap of being counsel for one party; the judge has the dignity of office and his words of advice and suggestion are listened to with respect. Behind him is the majesty and power of the state, so that most honest persons approach a court reluctantly and with fear. Imagine how delightful is their relief to find a wise man, interested in their trouble, solicitous to explore ways of possible solution that may save their time and money. The stage is all set for the avoidance of many tragedies and their quick conversion into comedies, but something is wrong in our system today. Either the hero has forgotten his lines or fails to enter until too late.

TELL THE TRUE STORY

The truth about conciliation will dissipate the fogs of ignorance and misunderstanding. The success of conciliation will overcome inertia and produce action. If the story is really told, our judges will welcome it because they will welcome any honest procedure that will promote justice. Accordingly I urge the legal aid societies and bureaus to tell the story and let the truth be known. All they need to do is to watch their records, note those cases where conciliation was attempted, where it failed and where it succeeded, and then to publish the results. Let them be specific and detailed citing case after case and showing exactly what the legal aid attorney accomplished and how he did it. Heretofore they have been content with general statements in their annual reports, but now we want specific instances and precedents.

Once the idea takes root we can, without passing a single new piece of legislation or without overturning any legal doctrines or principles, accomplish a quiet revolution in the administration of justice. Alert, skilled and sympathetic judges will find clogged dockets beginning to move, the number of cases they can properly dispose of largely increased, and the whole cost to the state lessened because conciliation procedure is a solvent. It appeals to the best in men and, because most men are decent, it accomplishes the desired result. Its nature is such that it works quickly, informally, and inexpensively.

To secure the disposition of a lawsuit quickly and cheaply in a manner that is acceptable to the parties is certainly justice. "Discourage litigation. Persuade your neighbors to compromise whenever you can. As a peacemaker the lawyer has a superior opportunity of being a good man"—was a good enough motto for Abraham Lincoln, who wrote it. It is satisfactory to the American Bar Association, which places these words at the head of its adopted Canons of Professional Ethics. Are not the words just as true and the advice just as sound if they are slightly paraphrased to read, "As a peacemaker, the judge has the supreme opportunity of being a good judge and a faithful minister of justice"?

Workmen's Compensation Administration in Massachusetts

By Robert E. Grandfield
Secretary, Massachusetts Industrial Accident Board

IT has been said that the Massachusetts Workmen's Compensation Act is a practical measure designed for use among a practical people. So, also, has it been said that a practical Industrial Accident Board administers this law in a practical way in Massachusetts. That is to say, the Massachusetts Industrial Accident Board is efficient. This is not the verdict of the Board, nor that of the writer; it is the verdict of every person, or bureau, or investigating committee or commission which has investigated the workings of the Act and the manner in which it is administered. No so-called or actual "red tape" is allowed to interfere with the speedy determination of the rights of the parties under the Massachusetts statute. Insurance companies are encouraged to make payments promptly and, generally speaking, coöperation, not opposition, is the rule. This does not mean that disputed cases do not arise. They do arise, and in sufficient numbers to keep a Board of seven members busy. Nor does it mean that compensation payments are not made promptly. They are. In the great majority of cases, compensation is paid without dispute. It is paid so promptly that the record of Massachusetts for promptness of compensation payments, both in fatal and non-fatal cases, is the envy of the compensation world. Even in disputed cases, compensation payments (when found to be due) are paid promptly. Because hearings are assigned speedily, decisions are made with promptness, and employees and their dependents know without long delays whether they are entitled to compensation under the provisions of the Act.

Paraphrasing and adapting the language of the Supreme Judicial Court of Massachusetts, in many cases, to the needs of this brief article, the Workmen's Compensation Act (General Laws, Chapter 152) may be characterized as an elective compensation insurance law, giving compensation for all injuries arising out of employment, regardless of negligence, except injuries due to the serious and wilful misconduct of the employee. The basic principle of the law is that the cost of injuries incidental to modern industry should be treated as a part of the cost of production. It was the beginning of a new kind of legislation dealing with a class of cases involving an infinite variety of circumstances. Its purpose was to substitute a method of accident insurance in place of the common law rights and liabilities of substantially all employees. It is a humanitarian measure enacted in response to a strong public sentiment that the remedies afforded by actions of tort at common law, and under the Employers' Liability Act, had failed to accomplish that measure of protection against injuries and of relief in case of accident which it was believed should be afforded to the workman.

When an employer takes out a policy of insurance to provide for the payment of insurance under this Act, the obligation of the insurer is as broad as the law. The Act is not designed to be accepted in part and rejected in part. All the terms of the Act are framed

upon the basis that the employer is either wholly within or altogether outside its operation. There is no suggestion or any phrase warranting the inference that there can be a divided or partial insurance, with certain exceptions. The law expressly exempts domestic servants, farm laborers, masters of and seamen on vessels engaged in interstate or foreign commerce, and persons whose employment is not in the usual course of the trade, business, profession or occupation of an employer. Purely maritime torts are excepted. But see Gillard's Case, 244 Mass. 47, injury to a carpenter working on an uncompleted vessel lying at dock in navigable waters; and Toland's Case, 258 Mass.—, decided March 3, 1927, injury to stationary fireman employed on a non-seaworthy dredge, in both of which cases it was held that the rights of the parties were within the jurisdiction of the Massachusetts Statute.

INTERPRETATION AND ADJUDICATION

The Massachusetts Board, from the very beginning, approached its task of administering and interpreting this important piece of social legislation with the fullest appreciation of its humane purpose and beneficent aims. A broad, but fair interpretation has been given the law, in harmony with its main object. The entire trend of the decisions of the members of the Board, of the Board as a reviewing body, and of the Court itself, indicates a sympathetic and just conception of the principles underlying this great humanitarian law, in the administration of which the soundest judgment and discrimination have been exercised in determining the true relation of conditions which incapacitate employees to the hazards of employment.

The Board's quarters scarcely had opened when fundamentally important questions were laid before its members for decision.

Were occupational diseases included within the scope of the Act?

Was a murderous assault of one employee by a drunken fellow employee covered?

Should the value of a minor son's board be deducted from his wage contribution and thus lessen the amount of compensation due his father under the statute?

These and other vital questions, in increasing numbers, came before the Board for adjudication.

PERSONAL INJURY

The Board carefully formulated a brief but comprehensive definition of "personal injury" in its first occupational disease case. (Johnson's Case 217 Mass. 388.) "'Personal injury,' as used in the Workmen's Compensation Act, is any injury, or damage, or harm, or disease which arises out of and in the course of the employment, which causes incapacity for work and takes from the employee his ability to earn wages." The employee in this case having been exposed to poisoning from his occupation of grinding lead for a period of 20 years, the question arose as to the date of the injury; and the Board found that the date "when the accumulated effects of this poisoning manifested itself, and Johnson became sick and unable to work, was the date of the injury." With but little change the Court adopted the language of the Board in a very able decision. This decision was cited with approval in O'Donnell's Case, 237 Mass. 164, and Bergeron's Case, 243 Mass. 366, notwithstanding the statement of the Court, in Pimental's Case, 235 Mass. 598, that "the Workmen's Compensation Act does not in terms include occupational disease."

So, also, in the murderous assault

case (McNicol's Case, 215 Mass. 497), the Court affirmed the decision of the Board, saying: "The injury came while the deceased was doing the work for which he was hired. It was due to the act of an obviously intoxicated fellow workman, whose quarrelsome disposition and inebriated condition were well known to the foreman of the employer. A natural result of the employment of a peaceable workman in company with a choleric drunkard might have been found to be an attack by the latter upon his companion." Therefore, it was held, adopting the conclusion of the Board, that "it seems plain that the injury of the deceased 'arose out of and in the course of his employment.'"

In the case involving the question whether the expense of a minor son's maintenance should be deducted from the amount contributed by him to his father when arriving at the dependency compensation due under the Act (Daniel Murphy's Case, 218 Mass. 278), the Board held that there was no provision for any deduction for board when the employee contributed all of his wages; that it was fair to assume that it was the intention of the Legislature in such a case that the statutory rule provided should be adopted; and that the deceased employee having contributed his entire earnings to his father, "the proportion contributed being 100 per cent, that there is due the said dependent from the insurer 100 per cent of the minimum compensation provided by the statute." Of this decision, which we have only briefly summarized, the Court said, in view of its clear exposition of the law: "We adopt the reasoning of the Board; and there is not much more to be said." (See, in this connection, Gove's Case, 223 Mass. 167, in which the Court said, "The Board were right in not deducting $5 a week, the value of the board which the dependent furnished to the deceased," the son in this case being over 21 years of age.)

From time to time the Board has issued printed reports of its own cases, decisions of the Supreme Judicial Court, informal rulings, held conferences with insurers, labor representatives, employers' groups, medical men, hospital representatives, and others, endeavoring to educate the public and to solve the questions and problems arising under the law.

CASES AWARDED COMPENSATION

New questions continued to arise—after sixteen years new questions now arise nearly if not actually every day. Old questions in new form arise many times every day and new and perplexing problems with them. Many questions have been settled with the passage of the years. The findings of fact of the Board are final, if there is any evidence to support them. "The question is not what conclusion we should have reached on the evidence, but whether the decision of the Board is rationally possible under the law." (Chisholm's Case, 238 Mass. 412.) The credibility of the witnesses, as well as the weight to be given to their testimony, is for the Board. (Pass' Case, 232 Mass. 515.) Reference is made below to a number of the many important cases in which compensation has been awarded. Pneumonia, due to inhalation of smoke and drenching with water at a fire (McPhee's Case, 222 Mass. 1); acceleration of a pre-existing heart condition by reason of a strain or exertion of the employment is covered (Madden's Case, 222 Mass. 487); acceleration of previously existing heart disease to a mortal end sooner than otherwise it would have occurred is an injury under the law (Brightman's Case, 220 Mass. 17); frost-bite is an injury (McManiman's Case, 224 Mass.

554); injuries at work, although not actually engaged therein—a personal telephone call (Cox's Case, 225 Mass. 220); on a common stairway at noon hour (Sundine's Case, 218 Mass. 1); on the premises leaving after the day's work is done (Stacy's Case, 225 Mass. 174); suicide while insane following injury to eye (Sponatski's Case, 220 Mass. 526); sunstroke while working at a sand bank (McCarthy's Case, 232 Mass. 557); drinking acid by mistake from a bottle supposed to contain water (Osterbrink's Case, 229 Mass. 407); fall into dangerous machinery by employee with fatal malady (Dow's Case, 231 Mass. 348); injury to teamster on public highway (Keaney's Case, 232 Mass. 532), and to insurance collector while running for public street car (Moran's Case, 234 Mass. 566); shooting of head waiter by discharged waiter (Cranney's Case, 232 Mass. 149); fatal injury to night watchman by his own pistol by reason of its accidental discharge in his pocket while shoveling snow (Fernald's Case, 240 Mass. 567); fatal injury to employee in rest room of employer as a result of fall from couch through glass door (Sullivan's Case, 241 Mass. 9); acceleration of preëxisting pulmonary tuberculosis to a fatal termination (Glennon's Case, 236 Mass. 542); death from self-imposed starvation, due to psychasthenia and acute depression resulting from injury (Sinclair's Case, 248 Mass. 414), and a dilated umbilical hernia due to lifting a piece of cloth, and resulting in death (Butler's Case, 243 Mass. 166).

NONCOMPENSABLE CASES

In the cases enumerated below, the Court held that the injuries referred to did not "arise out of and in the course of" the employment: Employee having impaired memory due to an injury received before law became effective wanders with his team into a swamp and contracts pneumonia from which he dies (Milliken's Case, 216 Mass. 293); death of employee whose employment made it necessary for him to pass over railroad tracks (Fumicello's Case, 219 Mass. 482); fatal injury to night watchman shot by officers of law who mistook him for burglars they were seeking (Harbroe's Case, 223 Mass. 139); injury to traveling salesman on icy public way (Donahue's Case, 226 Mass. 595); injury to employee who attempts to open fastened window (Borin's Case, 227 Mass. 452); nervous condition dependent upon poor posture of body (Pimental's Case, 235 Mass. 598); injury during noon intermission in factory workroom where male employee allows female employee to sit on his knee and converses with other employees (Rochford's Case, 234 Mass. 93); injury to employee who out of idle curiosity takes hold of electric lamp to enable him to look into a tank (Maranofsky's Case, 234 Mass. 343); injury through bursting of bottle which employee was attempting to fill at a bubble fountain (Bolden's Case, 234 Mass. 535); injury to employee who leaves his machines to go to roof to attempt to repair defective ventilator from which water drips upon him (Koza's Case, 236 Mass. 342); unexplained fall of bus boy into elevator well (McMahon's Case, 236 Mass. 473); injury to employee who is knocked down while proceeding to ring out on time clock, as a result of fooling by other employees hurrying to ring out (Lee's Case, 240 Mass. 473); injury to employee as a result of advising fellow employees of different nationalities not to quarrel over the possession of certain tools (Gavro's Case, 240 Mass. 399); injury to strike-breaker after leaving plant of employer (Rourke's Case, 237 Mass. 360); fatal injury to

motorman after leaving car at a point where the custom was to seek refreshment and relieve nature (Garner's Case, 247 Mass. 308); death of employee, caused by striking his head upon a concrete floor to which he fell for some physical reason not connected with his employment (Cinmino's Case, 251 Mass. 158); injury sustained in attempting to reënter a train from which employee had alighted by mistake, thinking that he had reached his destination (Withers' Case, 252 Mass. 415); fatal injury to employee by bursting of boiler while he was sitting in boiler room during the lunch period (Babineau's Case, 254 Mass. 214).

"OPEN DOOR" POLICY

The policy of the "open door" prevails at the Industrial Accident Board. The humblest workman may see any member of the Board and obtain his advice in regard to his rights under the law. Thousands of employees avail themselves of this right during the course of a year. Members of the Board deem it their duty to afford this opportunity to them. It is one of the factors that has contributed materially to the reputation and success of the Board. It keeps the members in close touch with the real problems that arise under the law. Insurers, lawyers, employers, labor representatives, members of the State Legislature, and all others who make up the great body of the public which have business with the Board and interests under the Workmen's Compensation Act, esteem highly their right to see members under this "open door" policy.

RESPONSIBILITY AND MAGNITUDE OF WORK

Every injured workman is a potential compensation case. Every widow and every orphan of a fatally injured workman may be entitled to compensation. The Board's duty is to see that compensation is paid, if due. Therefore, no matter what may be the source of the information, whether from the columns of the newspapers, through the clipping service subscribed for, through oral information at the office of the Board or to any of its employees, through written communication, or by official report, that report is run down, investigated, and followed up until it is determined whether or not there are any rights under the law.

This is not a statistical article, but reference should be made briefly to certain facts which will indicate the magnitude of the work of the Board. There has been an increase in the number of employees covered by insurance under the Massachusetts law, from a half million in 1912 to one and one-half millions in 1928; an increase in the number of employers taking out policies of insurance from 18,000 in the first named year to 50,000 in the latter year; an increase in the number of reported injuries from 90,000 in the first year to 170,000 in the sixteenth year; an increase of from 36,091 tabulatable injuries (injuries causing the loss of at least one day or shift from employment) in the first year to 64,162 in the last year; and an increase in compensation payments from one and one-half millions to a sum in excess of eight million dollars. The third annual report of the Massachusetts Judicial Council (Public Document No. 144, November, 1927) officially recognizes the importance of the work of this administrative Board. It shows that in 1926 the cases entered in the Superior Court in all counties, both civil and criminal, were 53,391 in number, and that "59,488 tabulatable injuries were brought before the Industrial Accident Board during 1926."

An actual five-day program of the

Board and its members, taken from its official diary, follows: First day, Boston assignments (four members), 23 cases; Salem assignments (two members), 11 cases. Second day, Boston assignments (three members), 16 cases; Greenfield, morning assignments (one member), 3 cases; Holyoke, afternoon assignments (same member), 5 cases; Springfield assignments (one member), 4 cases; Worcester assignments (two members), 13 cases. Third day, Boston assignments (four members), 19 cases; Springfield assignments (two members), 13 cases; New Bedford assignments (one member), 6 cases. Fourth day, Board reviews, two boards of three members each, 28 cases. Fifth day, Boston assignments (four members), 15 cases; Fall River assignments (two members), 12 cases; Lynn assignments (one member), 6 cases.

OFFICE PROCEDURE

Follow briefly a report of injury through the office procedure. It is time-stamped and numbered; indexed; notice with information of rights sent to the employee; followed up for agreement to pay compensation, and if no agreement received why not; compared to determine whether compensation agreed upon is correct; inspected to determine whether additional compensation for certain specified injuries is due; followed up to see that such compensation, if due, is paid; if not paid, referred to hearing for formal determination; certain cases referred for impartial medical examination; medical reports obtained from insurers in every case of serious and materially disabling injury; such reports carefully examined to determine what if any further rights are due; followed up to see that such rights are made effective; average weekly wage questions taken up first by correspondence, later if necessary for investigation by the Board's inspectors; check-up made to see that the sum total of compensation paid as reported in each case agrees with that due according to the Board's records; notice taken of wages received by injured employee upon return to work; if lower earnings shown than at time of injury, follow-up to determine the cause; if employee's loss of earnings is due to injury, followed up until rights are adjusted or determined in accordance with the provisions of the Act.

INVESTIGATION OF CASES

Every fatal case is investigated. An inspector of experience, with knowledge of the application of the law to the facts, makes the investigation. His duty is to get the facts, report the sources of his information, give the names of witnesses, get statements from the attending physicians, and in brief to make a concise and complete report to the Board. Upon that report the further acts of the Board are predicated. If the case is without question beyond the scope of the law, no affirmative action is taken by the Board beyond notifying the widow of her right to a hearing if she so desires. She is urged to consult her husband's physician and to secure his opinion before filing a claim with the Board and requesting a hearing. In the majority of cases, compensation is paid promptly to the dependents, many of the insurers having established an enviable record in this respect by making the first weekly compensation on the exact day to a week after the fatality occurs. The remaining cases reach either the hearing or conference stage, some being adjusted by advice of a Board member in conference with the parties, the remainder not being settled until hearings have been held and decisions filed. In every case in which counsel do not enter an appearance for the widow or other dependents, where it

appears to the Board that counsel are advisable, the dependents are advised to this effect. The suggestion is made that if dependents are without means, the case may be taken up with the Boston Legal Aid Society, which is organized for the purpose of furnishing legal advice to persons having little or no means.

Cases involving the rights of young and inexperienced workmen, including minors, are specially investigated. Such employees are entitled to have their compensation payments based upon the wages which they otherwise would have earned "under natural conditions," if their injuries had not been received. Cases involving discontinuance of compensation and the right to discontinue are investigated carefully. Compensation may not be discontinued under the Massachusetts law, except with the written consent of the employee, or of the Board or a member of the Board, unless the employee has in fact returned to work earning full wages. Ordinarily, before such requests are acted upon, the opinion of an impartial physician is obtained; frequently conferences are arranged with the parties; and in instances where refusal to accept light work is alleged as a reason for the request, a special investigation is made by an inspector of the Board, accompanied by the employee, to determine whether the work is available, whether it is suitable, and whether the employee can perform it.

LUMP SUM SETTLEMENTS

Lump sum settlements receive and merit the most careful consideration. It is the rule that all such settlements shall be investigated. There is a triple check on such adjustments. There is an investigation by an experienced inspector, a study of the case on its merits and the reasons underlying the settlement, with a report on the services performed by the attorney, if there is one in the case; full consideration of the case in all its aspects by a member of the Board, with recommendations for Board action thereon, including the fee to be paid to the attorney; consideration by the Board in regular meeting assembled, approval only being given if the record shows that the proposed settlement is fair and is for the best interests of the employee, the fee of the attorney, if any, being fixed and made a condition of the settlement. The attorney may not, under any circumstances, take or accept a larger fee than that fixed by the Board.

CONFERENCE SYSTEM

A word should be said here of the Board's conference system. Conferences are arranged, with a Board member presiding, and the parties in dispute in attendance. These conferences, being informal, do not require the presence of witnesses. Interpreters are available to assist the Board member to obtain a correct statement of the facts from the employee of foreign birth who is unable to speak the English language. Impartial examinations by duly registered practitioners aid in getting an unbiased report of the employee's physical condition, its relation to the injury and his working capacity. The saving in time, counsel and witness fees, to the parties, if the case is adjusted, is obvious. The narrowing of the issue brings a similar saving, although to a lesser degree, in the event of a hearing. The saving of time to the Board has made it possible to dispose of an amount of work which otherwise would have been impossible if the statutory procedure had been followed in each disputed case.

The Board deals most severely with itself. It sets up the highest standards of speed in the hearing and determina-

tion of cases by its members. Disputed cases are assigned for hearing before individual members in the order of receipt, in Boston and every important community in the Commonwealth. Whenever necessary or expedient, hearing cases may be assigned within 24 to 48 hours of the receipt of the request for a hearing. Ordinarily, they receive assignments within four weeks of the time the request is received. Members hear cases, when the circumstances require, at the home of the seriously injured employee, at his bedside in the hospital, or wherever special circumstances and the exigencies of the case make it advisable. The members are charged with the duty of making "such inquiries and investigations as shall be deemed necessary," and they perform to the fullest extent this duty. They take an active part in the proceedings. They satisfy themselves as to the merits or demerits of each specific case before they come to a conclusion as to the rights of the parties under the law. They are required to make a report of the material evidence received at the hearing in each case. They set up as an ideal, to be attained if possible, the filing of all decisions within two weeks after the hearing is held. Their record in this respect is remarkable. Members vie with each other in keeping off the delinquent list which is furnished the Board and its members every week showing the number of cases which have not been decided and filed, under this rule.

IMPARTIAL PHYSICIANS

A most important part of the work of administering the Workmen's Compensation Act is that performed by Board members in connection with their appointment of impartial physicians. The law provides that the Board or any member thereof "may appoint a duly qualified impartial physician to examine the injured employee and to report," and that the report of such physician "shall be admissible as evidence in any proceeding" before the Board or member, "provided that the employee and the insurer have seasonably been furnished with copies thereof." (G. L., c. 152, s. 9.) This unique feature of procedure under the Massachusetts statute is of major importance to its fair and efficient administration. To the injured employee without the necessary means with which to employ skilled physicians to testify in his behalf it is vitally important. It is the function of the impartial physician to aid the Board and its members to ascertain and determine the medical facts underlying the employee's claim and thus help them materially to come to a determination in regard to the causal connections between the conditions which incapacitate the employee and his injury, if any, under the provisions of the Act. He is selected for his training, his skill, his experience, his fairness and his ability to come to a helpful opinion based upon his examination and the history and facts in the case. He is paid by the Board, although the law requires the insurance company to reimburse it for the amount paid the impartial physician. Physicians of eminence in their profession, specialists in the different branches of medicine and surgery, have placed themselves at the disposal of the Board for such work. Members of the Board, recognizing from experience the value of the unbiased opinion of a physician of the highest standing in a disputed case, avail themselves quite generally of their services. In connection with the physical examination made, the examining specialist has at his disposal, prepared by the member, a history of the case, a résumé of the evidence heard by him if a hearing has been held,

Progress in Trial by Jury

By A. G. Burr
Associate Justice, Supreme Court, North Dakota

THE period of "Progress in Trial by Jury" is confined to the last twenty-five or thirty years. It is a "far cry" from the time when the jury was selected from among the witnesses to the present time when we seek to get those whose minds are not in any way tinged with knowledge of the facts. This complete reversal required centuries for its accomplishment. The swing to the opposite extreme inevitably produced evils so apparent that efficacy of trial by jury was seriously questioned by practical and intelligent people. Among the more serious charges brought against the system are those of cumbersomeness, expense, ignorance and inefficiency, and undue advantage to defendants in criminal cases. In fact, many theorists advocated abolishing trial by jury almost entirely, and suggested the substitution of "Boards of Experts" to assist the trial judges. To partisans of the jury system it was evident there was need of reformation. It is my purpose to indicate some changes introduced to remedy the situation.

Cumbersomeness

Better Jurors

Some attack the method of filling the jury list employed in sparsely settled communities and States. For instance where each county is required to keep a jury list of two hundred names and the clerk finds that names must be supplied, he notifies the Board of County Commissioners of the number requisite to keep the list to its quota, and the Board apportions this among the various townships, cities and villages. The governing Board in each of these municipalities then proceeds to select from the qualified citizens the number assigned. Thus, in the choice of intelligent men and women to act as jurors, we have the judgment of thirty, forty, fifty and maybe one hundred different groups of men who too frequently select because the person chosen needs the little job, or has time to spare, or for some reason other than the one prescribed by statute.

To secure more competent jurors it is said we should apply to State Courts the methods in vogue in the Federal Courts and have the Court appoint a jury board empowered to select men and women with the statutory requirements. It is argued that such jury board would be governed solely by the requirements of intelligence and judgment. Opponents urge that such Board would be more susceptible to prejudice and partiality and that it is easier to manipulate one board to the detriment of suitors, than for the governing boards of cities, villages and other municipalities to conspire to injure any litigant or class of litigants. It is apparent that a system which works well enough in a sparsely settled community will break down in congested districts. In the large cities jury boards under the supervision of the Courts will be more apt to choose a better class of jurors than a governing body selected from a political standpoint. The attempt to apply the jury board system in place of the older one is an indication of the public awakening to the demand for more competent juries.

Unanimity

The unanimous verdict of "the twelve good men and true" is a cherished institution but in recent years there has been an increasing demand for a change in civil cases owing to the frequency of "the obstinate juror" and the possibility of bribery. One dissenting juror causes a mistrial, further expense and delay, with consequent loss of interest and the feeling that justice is not being administered correctly. In several States legislation has been adopted permitting a verdict to be rendered by a major portion of the jury after the case had been considered for a certain specified time. Frequently this proposed change conflicts with Constitutional provisions. For example, the Legislature of North Dakota, in 1923, provided that "the agreement of five-sixths of any jury (in any Court of record) shall be a sufficient and valid verdict" after the case had been submitted to the jury and considered for twelve hours. However, this was declared to be in violation of Section 7 of the Bill of Rights of the Constitution of the State which provided that "the right of trial by jury shall be secured to all, and remain inviolate, interpreting the phrase "trial by jury" to mean trial by jury as in vogue before Statehood.[1] Where there is no Constitutional inhibition such legislation would be effective. The Province of Manitoba has a statutory provision that:

> in a trial of issues of fact in civil actions intended to be tried by a jury, whether common or special, there shall be impanelled and sworn twelve jurors; but the verdict of nine or more of them shall be sufficient and shall be the verdict of the jury.[2]

The unanimous feature opens the door for successful bribery in important cases. In appeals in equity cases which may involve the determination of a series of involved and complicated facts the Appellate Court by majority vote will determine these facts and there appears to be no valid reason why the jurors' verdict must be unanimous. The Constitutional objections will be remedied in time, whenever the demand becomes insistent.

Smaller Juries

Although a jury of twelve men is the historic jury, in recent years there has been much legislation providing for juries of less than twelve but generally conditioned on consent. Such provisions are of little value. Parties now, except possibly in the trial of felonies, may consent to waive a jury entirely. If a smaller jury is to be a remedy for any evil it must be compulsory. In Manitoba there is legislative enactment to the effect "that it shall be competent for the parties to the cause or their counsel, by agreement, to try any such issue with a less number of jurors than twelve, provided the number be not less than nine."[3] It will be noticed there is a limitation to the agreement which evidently is intended to preserve unanimity as to the nine. It should be left to the discretion of the trial Court to order a smaller jury, depending on the amount and the issues involved.

Grand Juries

A large number of States have substituted "Informations" filed by the prosecuting attorney in lieu of an indictment; although retaining legislation providing for the calling of a grand jury, if needed. The grand jury may be used when it is difficult to get evidence, but generally it is easy to have the one injured, or some one

[1] *Powers* v. *Williams*, 53 N. D. 54.
[2] 48 V. c. 15, s. 46; 53 V. c. 2, s. 12.
[3] Ch. 81, Sec. 78, 1 R. S. 1891.

interested in the injured person, file a complaint with some justice of the peace. Upon preliminary examination, if a crime is shown to have been committed and there is reasonable ground for believing the defendant committed it, he will be held to answer to the higher court and therein the prosecuting officer will file his "information." In some of the States if the evidence produced at the preliminary examination discloses a crime other than the one charged in the complaint the prosecuting officer may file his information for such crime disclosed by the evidence. This makes for speedier trial. As a matter of common sense a defendant is not entitled to more than one preliminary investigation. The simpler this process, the better for justice, so long as the defendant's rights are safeguarded. The presumption of innocence and the requirement of proof of guilt beyond a reasonable doubt are as amply protected by this method as in cases where a grand jury is obligatory.

EXPENSE

"Overhead" in justice is a serious problem. Provision must be made for challenges for cause and for a reasonable number of peremptory challenges. Thus in each case there must be present a sufficient number to permit of all challenges allowed, the jury selected, and a sufficient number to proceed to the trial of the second case while the first jury is deliberating on the matter submitted to it, or about forty jurors for each case. In cities where a number of Courts are in session at the same time the question of expense is an important item. Smaller juries, referred to before, is an attempt to reduce cost. In a few States jury trial is dependent upon the amount in controversy. For example below certain amounts, no jury trial would be permitted; between this and a greater sum a jury trial is permitted provided the cost is deposited with the Court; and above this amount jury trial is obligatory. This division is not logical in the light of the historic right of every man to demand a jury trial in law cases; but it is evidence of the Anglo-Saxon method of modifying theory by practical necessity.

Same Jurors in Similar Cases

A more serious item of expense comes from the necessity of having different jurors to determine the facts in similar cases. Under the usual statutory provisions litigants are entitled to jurors who have no "unqualified opinion or belief as to the merits of the action founded upon knowledge of its material facts or some of them." This has been held to mean that in a series of cases involving similar facts and where one of the parties is common to the whole series such party is entitled to different jurors in each of the series of cases even though the facts are practically the same in each case. For example, an insurance company issued several hundred insurance policies against drought, hail, etc. It is manifest that where drought destroyed the crops insured each of the insured had a cause of action against the company, and the fact of the insurance policy and its terms, the loss of crops, their value, etc., would be the same in all cases. It was held that under such statutory provisions the company was entitled to different jurors in each case even though there might be several hundred of the cases in one court.[4] When it is considered that it requires about forty jurors in order to furnish the necessary twelve, the expense of trying these cases was tremendous, and was a heavy burden on a sparsely settled community.

The parties could have waived a jury

[4] *Wilkins* v. *National Fire Ins. Co.*, 48 N. D. 1295.

in each case and on appeal to the Supreme Court that tribunal would have been perfectly competent to pass upon the same facts in each of the cases, if a review of the evidence was required, and determine the same by a majority vote. There is no logical reason why a juror trying facts should not be permitted to sit in a similar case where the witnesses and the facts are identical. To remedy such a situation legislation is proposed permitting a juror to sit in all cases when it appears to the satisfaction of the court he can try the case fairly and impartially for the litigants. Obviously if farmer Jones' crop is destroyed by drought and farmer Smith living side by side loses his crop by drought it would not need a new jury to decide that it was the same dry period that destroyed both crops. Had the litigants assigned their claims to one, he could have set up a hundred different causes of action and had all tried to the one jury.

Amalgamation of Cases

Another attempt to remedy this question of expense is shown by the New York Civil Practice Act of 1921. This act permits:

> all persons to join in one action as plaintiffs, in whom any right to relief in respect of or arising out of the same transaction or series of transactions is alleged to exist whether jointly, severally or in the alternative where, if such person brought separate actions, any common question of law or fact would arise.[5]

One hundred and ninety-three persons joined as plaintiffs and the Court, in a unanimous decision, upheld such legislation as not violative of any Constitutional provision.[6] Such legislation is an advance step and will do much toward cutting down expense.

[5] Sec. 209, Civil Practice Act.

[6] *Akeley, et al.*, v. *Kinnicutt, et al.*, 238 N.Y. 466, 144 N. E. 682.

IGNORANCE AND INEFFICIENCY

The charge that too many jurors are ignorant and have prejudice against certain classes of litigants is widespread and there is ground for such objections. The average juror, though a person of intelligence and common sense, has no special training in many of the intricate matters arising in industry. Some, therefor, advocate the doing away of the system entirely, and the substitution of "experts." It is claimed more intelligent verdicts would be returned, and again an attempt has been made to combine this practical relief with the historic trial by jury. For some time Tennessee has had legislation wherein special cases involving intricate questions of economics, engineering, banking and other problems could be submitted to jurors having special qualifications along these lines.[7] In New Zealand there is provision made in "Juries Act" for such special jury with expert knowledge of the points involved in the case. Such special juries would be a happy combination if the system would work. The average practicing lawyer and the trial judges look upon such substitution of "experts" with a good deal of suspicion. They have had first-hand relationship with these "experts" and familiarity has in many cases bred contempt. They are not enamored with the proposition so as to conclude that this would be a panacea. It is an interesting movement to watch, although it does not seem to be gaining much headway. For this reason one might conclude it is not as satisfactory as its advocates claim. As noted by the Supreme Court of Michigan there is the tendency of "experts" to substitute what they think ought to be for the thing that is.[8]

[7] See *Bruce* v. *Baell*, 100 Tenn. 573.

[8] *In re* Ferguson Estate, 215 N. W. 51.

Special Juries

Modern legislation is providing for special juries in the interest of economy —"special," not because of the qualifications of the jurors, but because they are called at special terms of court. For example, Manitoba makes provision as follows:

> The following persons shall be liable to serve as special jurors, that is to say justices of the peace, bankers, insurance and stock brokers, merchants doing business by wholesale or by wholesale and retail combined, and the chief officer, manager and other chief representative of any body corporate, domestic or foreign, doing business within the Province.[9]

Evidently the saving of time and expense is the chief object of this special jury.

Special Verdicts

The special verdict is increasing in favor. The objections that material matter may be omitted, or that conclusions of law may be found instead of facts, or the questions may be so framed that the jury can determine the result of their findings, and similar objections should be addressed to the judge. Where it is apparent there is a general prejudice against a party to an action, such as a railroad company, or a mining or other corporation which comes in contact with the general public, the defendant will have a serious handicap to overcome. In such cases special verdicts on the real issues involved are of great assistance in the administration of justice. These can be so framed as to present merely the ultimate questions to be determined. The rules of law are such that the questions and answers will not disclose to the jury what will be the effect of their findings. As said by Professor Sunderland in the *Yale Law Journal* for January, 1920:

> The special verdict is devised for the express purpose of escaping the sham of false appearances. Its avowed purpose is to show the truth—what is wanted is a method of using the principle of the special verdict under conditions which will make it a practical and workable tool for the ordinary lawyer in the ordinary case.

Today many States require the Court to submit a special verdict on the demand of either party or on its own motion.

UNDUE ADVANTAGE TO THE DEFENDANT

Defendant's Negligence

In the anxiety to safe-guard the rights of the accused criminal procedure had gone to such extremes that a layman might well wonder if the system were not devised for the purpose of aiding the criminal to escape. Where the State inadvertently had permitted one who did not possess all of the statutory qualifications to sit as a juror in the trial of a criminal case it was not uncommon for the defendant to set up the fact of this disqualification and ask for a new trial. Today we find an increasing tendency to put upon the defendant in a criminal case responsibility for the ascertainment of facts which could well have been found by him prior to the trial.[10] The United States Supreme Court has adopted this forward looking principle on an application for *habeas corpus*.[11] The earlier decisions upheld the old rule that this disqualification could be taken advantage of on a motion for a new trial.[12] The Courts of New York seem to adhere to the old rule and hold that the fact a juror was an alien was sufficient ground for a new trial in case of murder

[9] Ch. 81, Sec. 67, 1 R. S. Man. 1891.

[10] *Oskershouser* v. *State*, 136 Wis. 111.

[11] *Kohl* v. *Lehlbach Sheriff*, 160 U. S. 293.

[12] *Hill* v. *People*, 16 Mich. 351.

in the first degree even though this question was not raised until after verdict, justifying it under the Constitutional provision found in Article 1, Section 1, of the New York Constitution which guarantees the defendant a trial by the "judgment of his peers."[13] The juror had been satisfactory to the defendant who evidently considered him to be perfectly competent, intelligent, moral, with good judgment, and equal in these qualifications to any other member of the jury.

Challenges

The right to peremptory challenge is one which both the State and the defendant should have within reasonable limitations. When the King had control of the selection of the jury panel, it was only reasonable that in the matter of challenges the defendant should have a greater number than the prosecution. This difference was carried over into the courts of the States and many gave to the defendant twice as many peremptory challenges as were given to the State. When the method of the selection of jurors is taken out of the hands of the prosecution so that both sides stand upon the same footing and the State has the burden of proving the defendant guilty beyond a reasonable doubt this disproportion in the number of challenges tended to render it quite easy to get disagreements in cases where it was quite evident the defendant was guilty of the crime charged. In the last year or two legislation has been enacted putting both sides on the same footing and giving to the State the same number of peremptory challenges as the defendant possesses thus preventing the arbitrary clean out of a jury after the State had exhausted its number.[14] What is wanted is a trial by twelve fair-minded, honest, intelligent and impartial men who will render a verdict according to the law and the evidence. Giving both sides the same number of peremptory challenges tends to secure a better Jury.

[13] *People* v. *Bott*, 201 N. W. Supp. 47.

[14] (North Dakota adopted such a statute in 1927.)

GENERAL

Atmosphere of the Trial

It is a sound rule for the effective administration of justice which forbids the use of affidavits from the jurors to impeach their verdict. To remove this bar is to open the case to endless litigation, affords chance for bribery, and permits jurors to be hounded by the unsuccessful litigant. Generally this rule is confined to what was said and what was done in the jury room, and the reason why the individual juror arrived at his verdict. Some States permit such affidavits to show alleged misconduct taking place outside of the jury room. There should, however, be a distinction made between forbidding jurors to impeach their verdict and receiving such affidavits to show that the case was tried in an atmosphere so vitiated that it is conclusively presumed impartiality and judicial temperament could not be secured. A mob spirit may work secretly, or a juror may have been bribed, and no one know of it except the juror and the briber until the juror confesses. To apply the rule in such case would shut out the only possible evidence there is to show that the case was tried under conditions intolerable to justice. In such cases it is immaterial whether the verdict was just or unjust.

Treatment

Progress has been made in treating jurors as human beings. The old method of locking jurors up with but bread and water except at the whim of

the judge is so evidently a matter of coercion that legislation provides jurors be given meals and comfortable lodgings to enable them to determine the case under proper surroundings and permit the court at its discretion to allow them to be taken to their meals even after a murder case has been submitted to them for consideration.

The illustrations given in this article do not exhaust the signs of progress in trial by jury. They show sporadic efforts to meet some of the more obvious complaints—complaints based on unwieldiness, expense, and general inefficiency. These changes follow the usual practice of an Anglo-Saxon governmental system—improvement here and there without a preconceived plan. After these changes have become embodied in the system then a general revision may be adopted by the legislatures. Until then the amendments must be made piece meal.

The Rule Making Power of the Courts

By Josiah Marvel

Formerly President, Delaware Bar Association

ASK any man on the street and he will promptly tell you that our Federal Government and our several State Governments are divided into three departments; the Executive, the Legislative and the Judicial. He will give you a general outline of the powers and duties of each department. He will know generally that the Executive Department operates through President or Governor and his assistants and advisors. That the Legislative Department operates through a House and a Senate. That the Judicial Department operates through the Judges called the Bench and the Lawyers called the Bar.

He cannot tell you, however, how far the Executive acts on the recommendations of his secretaries and advisors or how far he delegates action to them. He cannot tell you how a bill is introduced into a House of the Legislative Department, and then read, referred, reported, amended, passed, referred to the other House and acted upon and finally enrolled and signed before it becomes a law. Nor can he tell you how the machinery operates in the administration of justice by the Judicial Department of Government. He knows nothing of writs, declarations, pleas, answers, motions or rules of evidence. In each case he simply stands by and expects proper results from each of the Governmental Departments.

Of course if any Department of Government fails to produce proper results as he sees it, he feels free to criticize to his heart's content. Jointly with his fellow citizens he owns the Government and all its Departments even though he does not vote at its stockholders' meetings on the first Tuesday after the first Monday in November every two years. He speaks of our Government, our Governor, or President, our Legislature or Congress either with pride or with disgust that runs almost true to the line of his Democracy or his Republicanism.

When he comes to view the work of the Courts he approaches it with an entirely different state of mind. He is practically free from political bias. He rarely looks upon a Judge as a Democrat or as a Republican while on the Bench. He could not tell you off hand whether the majority of the members of the Supreme Court of the United States are Democrats or Republicans. He almost never questions the soundness of judicial decisions and very rarely questions the soundness of the verdicts of juries. He does not hesitate, however, to criticize the law's delays and will cite to you cases that have taken years in which to reach a final judgment. He will ridicule the mysterious technicalities surrounding the various legal steps taken in the progress of a suit and charge that the Court and lawyers are jockeying with justice while the litigants are suffering from the delay and at the same time paying the bills. He will join Chief Justice Taft in charging that the administration of criminal justice is a disgrace. In all of these things he does not think of Bench and Bar as being dishonest but simply as being inefficient.

This plain business man that you meet on the street looks about and sees progress in efficiency everywhere.

Every business that he knows about has kept step with the needs of the times except the business of administering justice between man and man. He complains of old-fashioned methods that permit a man to secure years of delay in paying his dollar debt to his neighbor and likewise permits a criminal to secure a similar delay in paying his debt to the community. He cries out that justice delayed is partially denied and that this applies as well to the man charging another with a breach of contract as to the community charging a member with a breach of its criminal laws.

It is a curious thing that this plain business man, this voter, this citizen of State and Nation, has not during the past two generations stopped to consider who is really at fault in these shortcomings in the administration of justice. He has simply seen these things happen in the Courts and quite naturally charges them to the court and to the lawyers who practice therein. Members of the Bench and of the Bar will not deny that there is a great deal of wrong in Court procedure. This sentiment has been voiced by judges and lawyers throughout the land in the last few years and they have proposed as a remedy that which they believe will cure a considerable portion of the ills complained of and that is what we call the Rule Making Power of the Courts.

RULE MAKING POWER OF THE COURTS

Courts are created and their jurisdiction defined by the Legislative Department of Government acting either through a Constitutional Convention, a Congress or a Legislature. Our law makers of 1787, and the years immediately following, apparently intended that the Courts when created should have power to select officers of the Court in the attorneys at law that were to be admitted to practice therein, and then lay down rules of Court to guide these attorneys at law in proceeding in behalf of a client to have his rights adjudicated. This was a very usual proceeding in Courts throughout the land, but it was not the only one. Now and again the Legislative Department of Government would not only create a Court and define its jurisdiction, but would lay down certain rules of pleading, procedure, and practice, by which the Court was to transact its business. Such rules may be very complicated or they may be very simple, but they are always more or less technical and necessarily must be, as they lay down the regulations that so far as possible eliminate the human element in the administration of justice and permit every man to come into Court in the very same way and save his opponents from surprise or oppression so that the rich will have no advantage over the poor nor the strong over the weak.

Efficient rules in this respect grow out of wisdom, training, and experience. No man could lay down rules for Court procedure that would result in a just, prompt, and efficient administration of justice without having these elements of wisdom, training, and experience. It should be clear to any one that the Bench devoting its entire time day after day and year after year to the administration of justice should best know what rules of procedure would produce the most uniform justice in the long run and be most capable of laying down the rules to produce this result. It should appear equally clear that members of the Bar who today represent one kind of a case, and on another day represent another kind of a case, and in the long run represent every kind of a case would be those most capable of advising with the Bench for the purpose of arriving at the proper rules of Court to be promulgated for the

purpose of regulating every litigant in his effort to have his own rights adjudicated by the Judicial Department of Government. This being true, it would further appear that the Judicial Department of Government composed of Bench and Bar should be given full power to carry on the administration of justice and then be held responsible for its proper administration. Such, however, has not been the view of the American people either in State and Nation for the last several generations.

COURTS GOVERNED BY LEGISLATURE

As was said above, this was the prevailing method during the early years of our Government, but a great change took place in the view of the people as expressed through their Legislative Department of Government about the middle of the last century. Then began the extreme development of the idea that the Legislative Department of Government elected by the people should not only create Courts, but should lay down rules and regulations governing the Courts in their methods and procedure. That the Legislative Department should not only define the jurisdiction of the Courts but should tell the Court how to exercise that jurisdiction.

The first big step in this direction was taken in New York in 1848. The idea was fathered by David Dudley Field and under his guidance the Legislative Department of the great State of New York enacted a civil practice code governing Court procedure down to very trifling details. This precedent was followed by other States until more than half of the States of the Union proceeded to lay down rules to govern the Courts in the transaction of their business.

It is a most curious thing that the level-headed business men who constitute the Legislatures of the different States who would refuse to build a house without the advice and assistance of an expert architect, and would refuse to build a road without the advice and assistance of an expert road engineer, would, however, proceed lightly to build a system for administering justice without the advice or assistance of any expert whatsoever.

You hear the people complain at the failure of the Courts in administering justice promptly and efficiently, not realizing that the Courts are administering justice according to the rules laid down by the people through their legislative Departments of Government. They are complaining at the Court's handiwork, not realizing that this handiwork is very largely their own. They complain at the Court's procedure, not realizing that it is the very procedure prescribed by their Legislatures.

This situation does not exist because the Legislatures are opposed to the theory of creating Courts and commissions with the power of making rules to regulate the exercise of their jurisdiction. The contrary attitude is shown by the fact that every Industrial Accident Board and every Public Utilities Commission created by the States is given the right to prescribe rules to govern the exercise of its powers and in most instances these Boards and Commissions are composed of laymen. Go to your Federal Statutes and you will find the power to prescribe its own Rules of Practice and Procedure has been given to the Federal Power Commission, the Federal Trade Commission, The Interstate Commerce Commission, the Board of Tax Appeals, the Board of General Appraisers, the Court of Customs Appeals, the Commerce Court, the Court of Claims, the United States Court for China, and the present Supreme Court of the District of Columbia. If the regular Courts are the only ones left to drag

the ball and chain of legislative supervision, it cannot be caused by an objection on the part of Legislatures to the granting of Rule-Making Powers.

It is another curious thing that the members of the Bench and the members of the Bar knowing this as no other set of people could possibly know it, stood by all these years without crying out against the injustice of having the Legislative Departments of Government creating rules of procedure for the Courts and then have the Judicial Department of Government criticized for its short-comings.

SITUATION CHANGES

Fortunately the situation is now changing. For some years past, leading members of the American Bar have pointed out this injustice. They have shown in magazine articles and addresses before Bar Associations that it was unjust that the Judicial Department of Government should be charged with short-comings unless the same Judicial Department should be clothed with the power of curing those short-comings. These apostles won disciples among the Bench and the Bar and thereupon the Bench and the Bar won disciples from among the people who speak through their Legislative Department of Government and now the tide is changing.

Two years ago a committee was created by the American Bar Association to take charge of the subject and that committee supplemented the work of the Bar leaders spoken of above and broadcasted the story throughout the United States. This same committee last year took up the matter with Bar Associations throughout the country and secured their coöperation and support.

The Legislature of Delaware was the first to be fully convinced and thereupon it enacted a statute empowering the Delaware Courts to lay down rules of pleading, procedure and practice, to fully govern Bench, Bar, and litigant in the various steps to be taken in the administration of justice. The Courts with the assistance of the Bar have proceeded to prepare the rules to be promulgated under this statute and in a short time the Judicial Department of Government of the State of Delaware will assume full responsibility for the administration of justice in that State and thereafter if the results are not just and prompt and efficient, the people can properly lay the responsibility at the door of its Judicial Department of Government and take such steps as may be needed to see to it that the defects are cured by this same Department of Government.

PROGRESS

This lead has been followed already by a number of States and it is being discussed and considered in more than half of the States of the Union. It is proposed in some States that the Court be authorized to act alone. It is proposed in other States that it act by and through the coöperation of the Bar. It is proposed in other States that there shall be created a Judicial Council composed of judges and lawyers properly appointed who shall see to it that defects in procedure be considered and submitted to the court for correction.

The Judicial Council method is probably the most scientific and the most certain of results. It has worked successfully for two generations in England and is proving to be most successful in some States of the Union. The work of the Judicial Council whose business it is to discover mistakes in procedure and to offer a remedy presents another very effective argument in behalf of the Rule-Making Power of the Courts. Changes in the

rules laid down in the code of Civil Practice in the various States can only be made by the various Legislatures as they may be in session, and to inefficiency and ignorance is added delay. This is avoided by the work of the Judicial Council who are in session weekly or monthly and as soon as it is discovered that a certain rule results in injustice or undue delay a proposal is promptly made to the Court to remedy the defect and the Court cannot only bring training and experience to the consideration of an amended rule, but it brings expedition as well.

The Judicial Department of Government was created by the people for the purpose of supplying the machinery of the Government for the administration of justice under the law for all of the people. If they have faith in the honesty and ability of those who constitute this Department of Government and desire the greatest promptness, greatest economy, and the greatest efficiency in the administration of justice, it is their duty to speak through the Legislative Department of Government and clothe the Judicial Department of Government with the power of making the rules and regulations that will produce this result.

Administering Justice in Cities

By Herbert Harley
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THERE appears to be no essential principle to support the scheme of court organization common to all our cities. In every city there is at least one court of general trial jurisdiction supplemented by one or more courts of limited jurisdiction. In some of the larger cities there are two or more of both general kinds and also a separation of civil and criminal jurisdiction in independent tribunals. This pattern has evolved during a century or more from a plan of organization adapted to the needs of the typical state at the formative stage of such institutions. The evolution has not been one making for efficiency in administration. Changes have come about by way of temporary adjustments without reference to any inclusive principle, and efforts at improvement have often been thwarted by inability to amend a state constitution.

Courts of Limited Jurisdiction

The courts of limited jurisdiction are often called city courts or municipal courts, but they nevertheless are created under the state constitution and statutes to administer state laws. Even though their territorial jurisdiction is limited to the city and they enforce city ordinances they are parts of a state judicature.

These courts of lesser jurisdiction embrace the most difficult and important functions of the entire judiciary. As to civil jurisdiction it may be said that successful trial of small causes calls for expeditious procedure and judges of high ability because the correction of errors by appeal is disastrous. There can be no real efficiency except in such cases as are correctly decided in the first instance and with little delay. In their criminal jurisdiction such courts are of paramount importance for reasons which are too obvious to require elaboration. They constitute society's first line of defense, not only in convicting guilty persons but equally in acquitting the innocent.

Such courts are unfortunate in making little appeal to ambitious lawyers. The work is far more disagreeable as well as less productive of income and professional reputation than judicial work in the courts of general jurisdiction. Salaries are smaller in these courts and the route to the judicial office is unattractive, to say the least. Finally the judges of the lesser courts are deprived in large part of the assistance and the stimulating criticism of the better element of the bar, as well as being subjected to the importunities of the inexperienced lawyers and the fringe of pettifoggers and shysters that exist in all large cities.

Growth of the Courts

The difficulties of the situation are roughly comparable with the size of the city. The small city ordinarily has a circuit or district court, a probate court and one or more justices of the peace. As the city grows in population it is customary to improve the justice courts by providing that justices must be lawyers, that they shall be paid by fixed salaries instead of by fees, and that they shall occupy quarters supplied by the municipality. As the city outgrows the facilities thus provided and more justices are author-

ized, it is not uncommon to divide this lowest court between civil and criminal jurisdiction, and often the tribunal established to exercise civil jurisdiction is given enlarged scope, extending from $100 or $200 to $500 or more.

Meanwhile judges have been added to the district court of general trial jurisdiction. A city of 100,000 population may have three such judges and three to five judges in the one or two inferior tribunals. With recurring additions to this primitive pattern the city gets along fairly well for a time, but usually there is inefficiency and complaint before it attains the quarter million size. And from that time on there is more or less failure to measure up to reasonable standards of service, resulting in the addition of more judges and sometimes in the creation of courts intermediate between the justice courts (under whatever name) and the district court. By the time the city has reached the million mark there are from twenty to thirty judges serving in three, four or five courts. There may be a specially created court for trials in felony cases, leaving the original district court to specialize in civil cases.

In virtually every state there is no opportunity at any stage of this evolution to unify the separate tribunals without constitutional amendment. It is not because reform measures are opposed to any constitutional principle but merely that the constitution was established without regard to the needs of great cities not yet in being.

FAILURE OF COMPLEX SYSTEM

But in every case, before a city has attained a population of a million, the complaints are frequent and well justified. In the court or courts of general trial jurisdiction and felony jurisdiction the notable defect is that of delay, and it is presumed that the addition of more judges will meet the need. But even if this diagnosis were correct, the cure is attempted too late. A few more judges are allowed after dockets have become hopelessly congested. Not only is the city growing rapidly but the volume of litigation is growing at an accelerated rate, partly owing to the fact that delay breeds litigation. The constitutional right to jury trial, involving incidentally delay of one or two or three years, is an invitation to every defendant to evade his just obligations. In some cases it is an invitation to plaintiffs to sue and embarrass defendants. Couple with this the not uncommon delay of one to three years in the appellate branches and we have a system that does its intended work only occasionally. Exact analysis of results is very difficult, but it appears fair to estimate that the general consequence is a doing of injustice in a large proportion of the cases that are filed.

The increase of judicial force usually does not keep pace with the increase in business, but this is not the only reason for failure of this remedy. Until recently these courts have been almost without administrative direction. Every judge has equal power with every other judge of the same court, and judges become as considerate of their colleagues as are United States senators. Although close administrative control of the business of the court is indicated there is a strong disposition on the part of the judges to continue in the old undirected, irresponsible way. In such a court, then, the addition of a few more judges does not result in a proportionate increase in the volume of work. There have been instances where an increase of 20 per cent in the judicial force has had no observable effect in the output.

But the burden of delay has been, on the whole, patiently borne, possibly

owing to the delusion that the next increase of judges will effect reform. The greater complaint, or the complaint even more certainly justified, has been in respect to the inferior courts. In them the salaries are so low and the tenure so uncertain that their judges are commonly from the petty politician class, even though lawyers. Their work is of social and political importance beyond exaggeration, but it does not interest the body of self-respecting lawyers who exert a strong steadying influence upon the higher civil court. They rarely consider the lesser courts at all, and when they do it is too often only to express their scorn.

GREAT POWER OF INFERIOR COURTS

The judges of the inferior criminal courts exercise very great power; they largely determine who shall be permitted to prosecute offenses of all kinds; they decide who shall escape prosecution; the people affected by their power constitute a very large share of the entire population, including all the poor and the ignorant. The politicians (meaning the vilest of them) do all in their power to control these judges. Knowing just what they want, the election machinery appears to serve their ends far better than the popular ends for which it was established.

Such was the situation in the larger cities twenty years ago, and is to a considerable extent today. During that period there has been considerable experiment and the emergence of a clear-cut plan for reform. Looking backward now, it seems strange that ordinary principles of political science and business organization were not applied to this field, for it should have been plain that the large volume of business involved in handling thousands of cases called for business organization and business methods, and that organization and direction were needed to conserve order, economy of effort, and personal responsibility on the part of judges. The same personnel can readily perform more work and better work under any plan of orderly control. And this control need not restrict the judicial independence of any judge in the slightest degree; it needs only to extend to administrative powers.

On the other hand, the reasons for the slowness of progress are readily understood. Judicial reform is entrusted to the lawyers, and they have not yet even worked out the organization of the bar. They are not yet generally impressed with the advantage to them of efficient justice. The very necessary conservatism which they embody protects the bad with the good.

Favored by good fortune in the form of a constitutional amendment, Chicago effected the first important advance by creating, in 1906, a court embodying business principles of management. To enable it to afford relief along the two most important lines it was given all the criminal jurisdiction of the justices' courts, fifty-four such courts being abolished, and unlimited contract jurisdiction to enable it to relieve litigants in the commercial field. In tort actions it was restricted to cases not exceeding $1000 damages.

This court of twenty-seven judges was given larger rule-making powers than any similar court in this country, under which powers it established a modern system of pleadings. It was given large administrative powers, most of which were vested in its chief justice. He was given the power to classify the business of the court and to assign judges at will to any class of cases. The judges were required to hold meetings to discuss the affairs of the court and to consider any complaints which might be submitted by

any person. While this court was made to compete in civil cases with others of the local congeries of courts, its simple procedure brought it a very large share of all the contract cases, and its money judgments, exceeding more than a million dollars a month, aggregate more than any other court in the world and more than all the other courts in the state. With the criminal and quasi-criminal cases the volume of business in recent years has exceeded 1000 cases per day. The court now has thirty-seven judges.

Administrative direction and rule-making authority very speedily proved their worth in Chicago's Municipal Court, and it was not long until other cities created courts embodying efficiency principles, but none went as far as Chicago. In all the others there is a jurisdictional limit which keeps these courts distinctly in the class of inferior tribunals.

VALUE OF SPECIALIZATION

The power possessed by Chief Justice Harry Olson of the Chicago Municipal Court permitted of the development of the principle of specialization, now seen to be of the utmost importance in the judicial field. From the beginning there was the usual classification of cases on criminal jury and non-jury calendars, civil jury and non-jury, and special calendars for attachment, replevin, garnishment, forcible entry and distress, citations and other special proceedings. In 1911 the chief justice directed that all cases affecting family stability, desertion, non-support, contributing to the delinquency of minors, and so forth, should be heard in a single branch to be known as the Domestic Relations Court, instead of in ten or twelve scattered police branches. To this new branch he assigned a judge selected for his special qualifications. The effect was immediate; for the first time understanding of the nature of these cases and unified policy became possible; means for alleviating evils were devised and scores of social agencies were enlisted as auxiliary agents of the court. The several organizations existing to protect women and children, whether Catholic, Protestant or Jewish, found their work greatly simplified under the new régime.

A central branch court for all traffic cases was later established by an executive order, and then one for cases involving prostitution, and one for all the criminal cases whatsoever brought against boys above the juvenile court age. It was in connection with this branch that the psychopathic laboratory was established, affording the greatest clinic in abnormal psychology in the world. In time three branches were devoted to the expeditious trying of small civil cases under simple rules of procedure.

These innovations were all highly successful, and for obvious reasons judges were chosen with precise knowledge of their individual talents and were kept in special branches long enough to give scope to the high degree of expertness which they attained. Each such judge was responsible for a most important duty. It was possible also to relieve these judges before they were exhausted by onerous duties. Plain business management was given its first real chance in an American court, and under conditions which gave it a severe test. Such courts could be established on a day's notice and altered or abolished as speedily. Such efficiency would be simply impossible if each tribunal depended upon the special enactment of a legislature.

The success, however, of the city courts embodying principles of unification and administrative direction has been mainly in giving form and con-

tent to proposals for reform generally in all cities and states. None of these city courts are perfect. In most of them the mode of selecting judges is a serious handicap, and all of them are at a disadvantage in that they exercise only part of the judicial power in their localities. They do some work much better than it was done formerly. The general principles involved may be adapted to the entire city or entire state, and must be in order to bring our judicature to its full efficiency.

More than fifteen years ago Roscoe Pound, observing the operation of efficiency principles in Chicago under Chief Justice Olson's administration, pointed out the need for unification of all the judges in every city in a single organization. That has been for a long time an accepted ideal and some progress has been made toward it. But for the fact that such reform depends upon constitutional amendment it would have been achieved before this.

PRACTICAL ORGANIZATION PLAN

In cities having a total force of ten to fifteen judges the powers of management might well be vested in the entire staff, with an executive to carry out the will of the majority. In larger cities it would be well to provide for two or more fixed divisions, each to have its own executive, who, with the chief justice, would exercise ordinary powers of control, while the most important matters would be determined by vote of all the judges. This very simple and inevitable form of organization is readily expandable to meet the needs of the largest city. Consider, for instance, a city with sixty judges. It would be appropriate to provide fixed divisions for the various kinds of litigation; (1) for civil jury cases, (2) civil non-jury cases, (3) criminal cases, (4) divorce, probate, juvenile and domestic relations cases, (5) chancery cases. Within each of these fixed divisions there should be such sub-divisions as appeared convenient, not by statute, but through administrative orders. In the civil non-jury division, for instance, there could be branches for attachment, replevin, garnishment, small claims cases and supplementary proceedings. In the criminal division branches for preliminary examination, felony trials, misdemeanor trials with and without juries, quasi-criminal cases, traffic cases and so forth.

Such an act should provide for a presiding judge for each such fixed division. These lesser executives, with the chief justice, should constitute a judicial council, or executive committee, charged with all but the most important powers of administration. The chief justice then would be the executive officer representing the will of the council. Such a simple scheme would afford a view of every activity of the entire court by the assembling of the six heads, at any time, on a few minutes' notice. And the council, in turn, would be represented every hour of every day in each department through its own presiding judge.

Such a plan provides responsible direction with no limitation of any judge's essential judicial power. It permits of the selection for every kind of work of the judge best fitted by experience or talent and of relieving him when needed of work specially fatiguing. It permits of experimentation to meet new conditions as they arise.

Another factor is needed to afford a maximum use of judicial power; it is expressed by saying that all the judges of the entire court should possess complete trial jurisdiction to the end that every judge may be available for any kind of service for which he may be selected. This does not mean arbi-

trary rotation or fixed terms of service in any division or branch. As to those matters only administrative direction will avail. But it means that every judge will be able at all times to deal with all parts of any given litigation, subject to rules and directions. It goes without saying that every such court should have a liberal share of rule-making authority.

There appears to be no good reason, however, why there should not be a class of judges of limited experience and lesser salary with opportunity for promotion. But if there are two classes the division should not be jurisdictional.

There is really nothing novel in this plan of organization. Experience in city courts long ago proved these theories and practices. It also proved the need for making all the ministerial agents of the court amenable to the court's authority. But there are debatable points, and especially as to the mode of selecting judges and their tenure, and the mode of choosing the chief justice. We must presume that in most cities the matter of selection and tenure will be improved only after organization has restored efficiency and the people have regained confidence in the judiciary. It seems idle to seek responsible modes of selection and longer tenure as long as the courts are obviously rendering justice in a slow, costly and more or less haphazard manner.

SELECTION OF THE CHIEF JUSTICE

But there is a present need for consideration of the problem of choosing the chief justice. It is usually assumed that this official will either be elected by popular vote or be chosen by his colleagues. Both methods have worked well in some instances and badly in other instances. Neither affords the slightest guaranty of success. There is very great risk in popular election, and this risk has not been in the slightest degree reduced by primary nominations or non-partisan ballots. A chief weakness of the alternative plan lies in the disposition of judges to choose a weak-willed executive. Where a long term is given there is opportunity for such a chief to develop considerable independence. A price paid for the act creating the unified criminal court of Detroit was including a section which permitted the judges not only to choose their executive but to specify his term. For each of two or three years the office was held by a capable appointee and a marvelous record was made. Then the personnel of the court was altered by an election and the judges who came into control were hostile to the courts established policies. The vicious practice of limiting the chief's term to one month was adopted and the court has drifted since like a ship without a rudder. On the other hand, the act providing a chief justice to be chosen by the judges of the Common Pleas Court of Cuyahoga County, Ohio, to serve for five years, resulted in an excellent choice.

But there are other ways to select a chief justice. The Illinois revised constitution submitted in 1922 provided one great court for Cook County with two divisions, one civil, the other criminal, and an executive head for each to be chosen by the supreme court of the state. The constitution was rejected, so the proposal is still academic, but there is much to be said for the idea.

The plan was formulated after more than two years of discussion and it appeared to meet the views of opposing interests in Cook County better than any other proposal. The two chief justices were to be selected by the supreme court from the judges of the

court and, since there was no provision to the contrary, they would hold their positions at the pleasure of the supreme court. It must be presumed that appointment so made would average very high. The supreme court would carry the ultimate responsibility for the successful functioning of the court in its two divisions and would have a compelling motive to make wise appointments in order to forestall complaints. It would at the same time be free from local political considerations, since six of the seven justices would be chosen from other parts of the state. And the chief justices so appointed would have a very free hand, subject only to the power of the supreme court to make a change at any time in case of disapproval. The plan appears to possess very strong merits.

The virtual impossibility of amending the Illinois constitution, and public apathy as to calling another convention, make progress in Chicago improbable for years to come. It may be noted, however, that a polling of the Chicago bar in connection with the work of the convention five years ago revealed a strong sentiment for the appointment of all Cook County judges as a great step toward a more able and more independent judiciary.

CLEVELAND A LEADER IN REFORM

Since the defeat of the Illinois draft constitution, due beyond doubt to its submission as a whole (which served to combine all disappointed interests however incompatible among themselves), the most promising place for court unification is Cleveland. That city profited a great deal from the notable Survey of Criminal Justice which followed the collapse of the first chief justice of the Cleveland Municipal Court. A big step was the provision by statute for the selection of a chief executive for the Common Pleas Court of Cuyahoga County, already referred to.

Chief Justice Powell, with the willing concurrence of the judges of the court, has raised its efficiency to a commanding position. Chief Justice Dempsey, the present head of the Municipal Court of Cleveland, rehabilitated that court, and a strong sentiment has existed for the merger of the two courts to achieve the ideals inherent in unification. A constitutional convention will be held in Ohio in 1932 and work is already starting among the bars of Cleveland and Cincinnati to arouse interest in substantial judicial reform throughout the state. A committee of the Cleveland Bar Association has recently reported a plan for unifying all the courts of the state under a chief justice to be elected by the people. The plan calls for appointment of supreme court justices by the governor with the approval of the senate, or the judicial council; the appointment of appellate court judges by the chief justice with the approval of a majority of the associate judges of the supreme court; the appointment of all trial judges by the chief justice with the approval of the judges of the appellate courts of the respective districts.

Without reflecting on this plan it is timely to suggest that reform in the selection of judges is primarily a problem of the cities and the trend of thought should be concerned with reform of and for the cities, leaving the smaller communities to adhere to popular election, there being little criticism of its results outside of the cities. The movement would be likely to prosper if this differentiation were made and there is no reason why methods should not vary within a state to meet actual needs.

The rejected Illinois constitution

contained a suggestive provision in respect to selection and tenure. It provided that the voters of Cook County could initiate a special election to vote on a proposal that judges should be appointed for six-year terms by the governor from a list of at least four names to be submitted by the supreme court. The plan also provided, in case of adoption, for the submission of the judges at the end of their six-year terms to the electorate to say whether they should be continued in office. The people then would be asked only to pass upon the record of a judge and not to confuse the issue with the claims of self-constituted rivals. It is presumed that it would result in long average terms and resultant security of tenure, making for expertness and independence and largely exorcizing the demon of politics.

Better organization and better modes of selecting and retiring judges are fundamentals of the tough problem confronting all the larger cities. It is impossible to say that one of these fundamentals is paramount. But, while both call for constitutional revision, and so involve prolonged discussion and agitation, there is rather less blind prejudice and hostile vested interest as to court unification than as to reform in selection. This situation may change in some places. It is timely to set in motion serious consideration of both kinds of reform as noncompetitive, but possibly independent movements. To wait until a constitutional convention is pending is to wait too long. Public education must begin before a convention is called. Until fundamental changes of the kind discussed are effected there will be no substantial improvement where reform is most needed, where, as is the case now in Chicago and New York especially, congested calendars create a situation which make the courts for many persons not avenues to justice but barriers to justice. For the greater part those courts and their procedure exist to prevent deserving claimants from reaching debtors.

PROBLEM NATION-WIDE

It might appear that only the needs of the largest cities have been considered, so this article should not close without saying that there are over fifty cities with a population of more than 100,000, the aggregate population being more than one-fourth of the entire country. All these more than fifty cities may properly be regarded as "large cities" from the standpoint of administering justice. Nearly all are growing, and in many of them the problem of justice is already difficult, or soon to become so. So we have really a national problem. Pretty much all that has been said in respect to judicial organization applies measurably to the entire list. In a city having twenty or thirty judges the organization would, of course, be much simpler than is needed for Chicago, or New York, or Philadelphia. But the same principles apply and are readily adapted to simpler conditions. In a city having but eight or ten judges there would undoubtedly be great saving and increased efficiency through unification. Only through such unification can we utilize the judicial force with complete effectiveness, and only so can we wipe out the disgrace of our inferior courts, most of which have inferior judges, all of which escape the stimulating criticism of the abler element of the practicing bar, and all of which constitute the tribunals closest to the people, the only tribunals that nine-tenths of them can ever apply to for protection, the tribunals whose influence in a social and political way are very much more significant than the courts of larger jurisdiction which monopolize the attention of the more self-respecting lawyers.

Greater Efficacy of the Trial of Civil Cases

By Thomas W. Shelton
Chairman, Committee on Uniform Judicial Procedure, American Bar Association

ONE cannot think of improvement except as a relative term. It is best measured by comparison and often by contrast. The first locomotive constructed would be "improved" by a visit to a modern machine shop, but it still would be wholly inefficient for the present demands of transportation. It has not advanced with the times. Patching and the approval of our forefathers would not increase its efficiency. So, it must be postulated that any procedure and practice that does not permit of a prompt settlement of controversies upon their merits is inefficient and its antiquity detracts from its usefulness. Starting from this unquestionable premise one may discuss the greater efficacy of the trial of civil cases through statutory experiments or patchwork without the risk of underestimating the need of a complete modernization of the administration of justice, such as the English courts underwent in 1873, when there was put into effect a scientific system of simple correlated court-made rules.

Manifestly there has been a measurable improvement in the mechanical operation of the American civil courts during the past decade. Otherwise the administration of justice would have become well-nigh impossible, instead of being expensively inadequate. It is yet so slow and technical as to congest the dockets, make necessary the use of arbitration courts, or discourage men into surrendering their rights. This condition has created a combative dissatisfaction amongst laymen and resentment amongst laywers that is dangerously lessening popular faith in the courts. Deeply conscious of this unnecessary menace, the American Bar Association and the several State Bar Associations have assiduously addressed themselves to its removal. It is the results achieved by these agencies to which one must look.

Two Bar Association Programs

The Bar Associations have proceeded in an orderly way, that there might be commanded the confidence of both statesmen and the public. Following a campaign of education, two well-defined programs have been prosecuted, in support of which there has been an unprecedented unanimity of lay and professional opinion. Only a militant minority of the Congress seems to be opposed. The President and the Chief Justice favor it. The ultimate object is to induce the Legislative Department of the Federal and State Governments, in their own interest as well as that of efficacy, to return to the courts, which are the agencies held responsible for the administration of justice, the power to perfect the tools with which they work; that it may be done scientifically instead of by slow and conflicting enactment by the Congress and Legislatures in the form of rigid substantive law possessing all the sanctity of the law it was designed to administer. This campaign has so far advanced as to enjoy the support of a large majority in both Houses of Congress. There has been done in the United States by way of engaging public confidence and interest in seventeen years what it took England more than a century and a Dickens and a Bentham to achieve. Efficiency in trials will in this way eventually be had. In the meantime,

while patiently awaiting this necessary legislative authority, amelioration of outright procedural hardships has been sought by the lawyers. Committees of the American Bar Association are constantly before the two Congressional Judiciary Committees imploring relief. This is so in spite of the once popular disposition to blame lawyers and the courts for technical delay and expense over which they have absolutely no control. Of these amendments we shall first speak since they manifestly portray such "improvement" in the trial of civil cases as has been slowly established. One is not unmindful that the interest of Congress and Legislatures in non-political legislation is difficult to attract; that they reluctantly part with any power once exercised; and according to James Madison, in the Constitutional Convention, they mean to "absorb all power in their vortex." Legislators are slow to respond to the truth that without competent courts to which the people can with confidence carry their differences democracy is doomed.

A Self-Governing Incorporated Bar

One thinks first of the judges and lawyers—the personnel engaged in the administration of justice—above the moral and ethical level of whom the administration of law cannot rise. It is obvious, therefore, that a qualified authentic control over the personnel is essential. The Bar cannot sensibly be held responsible for the irregular or unethical acts of an individual lawyer because of absence of any restraint over him except his own self-respect. This condition has militated strongly against the influence and usefulness of lawyers and judges and often made of them the butt of caustic criticism or inane jests. One therefore looks upon the proposed incorporation of the whole Bar of a State as a regulatory agency giving promise of assured high professional standards and conduct.

Education, the basis of professional qualification, is now assured. It is the public that suffers from a lack of preparation and adaptability in lawyers, of which vital fact the laity has heretofore seemed unconscious. The adoption by the standard law schools of the recommendation of the American Bar Association of two years of collegiate training, or its equivalent, and a three-year law course as a condition leading to a degree, is a distinct advance. It is not believed that any competent man will be kept from the Bar, but one who holds himself out to be the adviser of others cannot consistently object to requirements of suitable qualification. Thus we will soon have preparedness, coöperation, organization and control coördinating in the making and the disciplining of the lawyers of the future.

Avoiding Congested Calendars

There is rapidly being realized a unified Federal Judicature which connotes a uniform Federal practice. For many years a United States District Judge could not be sent out of his circuit, although he had nothing to do and the courts in other circuits were far behind. A business man would have corrected this fault instantly. Congress finally became shocked into allowing outside judges to be "loaned" to the Southern District of New York (New York City) where delay had become well nigh a deprivation of justice. Finally the "loan" of judges was further liberalized. Eventually geographic limitations on service will be substantially wiped out, when Federal circuit and district judges, though appointed for particular territories, will preside where needed. The whole thing is within the control of Congress.

The salaries of both Federal and State judges have been substantially increased. The great Supreme Court of the United States found itself so far behind on its rapidly accumulating docket that Congress finally limited the "right" to a hearing in that Tribunal by leaving it, except in a few instances, to the judgment of that court on *certiorari*. By limitation of appeals, many cases now become final in the nine Circuit Courts of Appeals except on constitutional questions, without increasing the jurisdiction or labors of these courts. A trial in a district court and a review by a circuit Court of Appeals as of right were thought to be sufficient, except where constitutional matters are involved. The same principle applies to State Courts. In this respect Thomas Jefferson, during his pre-political days, expressed the opinion that "when a cause has been adjudged according to the rules and the forms of a country, its justice ought to be presumed. . . . Multiply bodies of revisal as you please, their number must still be finite and they must finish in the hands of fallible men and judges." Grover Cleveland said, "To me nothing can be more deplorable than that open criticism of the decisions of courts which, all at once, has become fashionable." Expedition and economy also demand the doing away with State intermediate appellate courts. Their necessity is debatable. One review on appeal ought to suffice. Constitutional questions may be taken to the Federal Supreme Court.

The "Declaratory Judgment," a procedure by which the courts are authorized to render judgments in actual controversies involving the rights of parties, before a violation thereof that would create a cause of action, is wisely being put into effect by the States. As a prevention against lengthy litigation and a preventable financial loss this new procedure possesses great merit.

JURY TRIALS

Juries are an expensive necessity. The waiving of jury trials is being stimulated by docket congestion and an inferior personnel. That it is saving much time of the courts and of business men who serve on them and expense to the State is a persuasive factor. It is a movement that had to overcome a strong Anglo-Saxon predilection, for "a trial before a jury of their peers" is a sacred thing in no wise to be weakened. But when one looks back to the origin of the sentiment it will be seen that the cause for it has lessened in modern governments. In the United States and England absolute monarchy has given way to democracy; the "pleasure of the prince" is supplanted by fixed law; the servile Geoffreys have been displaced by an independent judiciary; autocracy has given way to justice and reason; and open defiance or distrust of judges have surrendered to patriotic submission. Both in England, which country has reduced the right to jury trials to a minimum, and in America, there has developed under democracies of differing characters a faith in judges that is the very corner stone of popular government.

There is a determined movement to elevate the personnel of juries. While professional "bench warmers" have been materially reduced and substitution greatly limited, one disasterous practice remains for which reactionary Appellate Courts cannot escape criticism for not supporting fearless trial judges. It is the rejection of high-standing men of intelligence and discernment, because of knowledge of the case or that an opinion may have at one time been formed. Hence jurors are often drawn from a strata of society not qualified, or probably wholly improper

for the sacred and highly intelligent duty of participating in the administration of justice on a substantial parity with the judge as to the facts. The rule is being rapidly relaxed by many trial judges, who are being upheld by Appellate Courts where legislatures have not interfered. A remedy one ventures to suggest is a greater power of discrimination in the trial judge; a minimum of interference by lawyers; a wider education through instruction by the judge as to the duties of the juror; and a more general call to service and shorter periods. Men who could serve a week without much sacrifice might be seriously injured in business if kept for a fortnight or a month. There should be a better understanding between the judge and jury. One recalls as a model Lord Mansfield's famous "Guildhall Jury."

EVIDENCE

While no Anglo-Saxon country will ever approximate the complete absence of restrictions upon testimony permitted in the French courts, the rigid rules of Greenleaf are being rapidly liberalized. It would be interesting to list them if space permitted. State statutes have given the trial courts a much wider scope in admitting testimony, and Appellate Courts are much more liberal in upholding trial judges where justice has been done. There is a wholesome tendency towards coöperation between judge and jury and lawyer. There is a decided tendency towards Sir Matthew Hale's definition that:

> as the jury assists the judge in determining the matter of fact, so the judge assists the jury in determining points of law, and also very much in investigating and enlightening the matter of fact, whereof the jury are the judges.

Based upon Lord Hale's view and the seventh Amendment to the Federal Constitution, the participation of the jury in passing on the evidence in the Federal Courts is subject to the "direction and superintendence" of the judge. The efforts of certain very able statesmen to destroy this meritorious practice by legislation have been unavailing. It is respectfully believed that such an act would be unconstitutional ("Spirit of the Courts," p. 200). Such a decision would justify its adoption in State practice generally. Technicalities that smother the facts are being brushed aside.

CIVIL JUSTICE COURTS

Civil justice courts for small claims, that hear cases within from five to ten days without a jury, have materially reduced the dockets of courts of record and the expense of trials. An appeal bond has destroyed the use of litigation for the purpose of delay. The importance and dignity of these courts have justified the honor and salaries that have drawn to their benches properly qualified men, except where politics have interfered. In large centres like Chicago and Cleveland, there is one jurisdiction composed of several courts directed by a chief justice who lists cases for each court and assigns judges thereto. The good name of jurisprudence has profited immeasurably by doing away with the scandalous fee paid justices of the peace courts. A recent opinion of the Supreme Court of the United States happily pronounced the illegality of these fee paid magistrates. No doubt small claim courts will now be erected in towns and counties.

RETRIALS

Retrials have always proved a means for abuse and delay. The rapid lessening of their number is in the interest of both justice and expedition. Granting the witnesses to be honest, the facts

are no longer fresh in their minds on a second trial, wherein unintentional wrong is done. Should the witnesses be dishonest the opportunity for fraud is without limitation. For these reasons new trials are a menacing temptation to fraud. Reversals for procedural or other mistakes are now mostly confined to prejudicial errors. Judgment is entered by the Appellate Court in accordance with "the right of the case." In some jurisdictions the case may be sent back for additional evidence as to specific matters, but none other. This is one of the most potent of all juridical improvements. It is as if Congress and the Legislatures had said to the judges: "Knowing that justice may be thwarted by the unscientific statutory procedure and practice we have forced upon you, you are set free to ignore it when it interferes with justice." Thus courts of law are becoming courts of justice.

EXPENSE OF TRIALS

The theory that the State should bear the expense of trials is based upon the guarantee of Magna Carta that justice shall not be sold. The principle is threatened by the ever-growing expense of trials. The poverty oath is charity. Justice is purchased when expense becomes inconvenient; it is forbidden when expense becomes prohibitive. These observations apply to some portion of the large class lying between pauperism and wealth. The levy in many jurisdictions, in addition to the regular costs of court, of a percentage tax on the amount involved in a suit for the benefit of schools or other public purposes has no proper place in jurisprudence. The worthiness of the cause does not justify the breach. The temptation of small fees to court officials taxed as "costs" is being removed. The senseless "bills of exception," a relic of the antiquated common law practice, are happily being abolished. The expense of making up records should be reduced for it is capable of prohibiting an appeal. Copying documents alone has become a heavy burden. As in England, the *originals* should be used with a petition for *certiorari*. Printing should be required only when absolutely essential to the Appellate Courts. It has become well-nigh prohibitive.

EXPERT TESTIMONY AND AMBULANCE CHASERS

The Press now fully appreciates the evil effects upon the public mind of "ambulance chasers" and "expert witnesses" and relief may be expected. The organized Bar is giving militant attention to the evil. There is an actual inability or refusal to draw the distinction between a bribe paid to a witness and "compensation" paid to an expert. It is argued that money was paid for testimony by one of the parties to the suit in each instance! It is popularly looked upon as a safe legal way to buy a verdict. The present tendency to vest in the judge the power to select expert witnesses when needed, to fix their compensation and name the source of payment, possesses corrective psychic influence of great promise.

The elimination of the ambulance chaser lies in the elimination of his profit. One ventures to say that no amount of duress or preaching will do it. It required thirty years for England to discover the fact. If the validity of contingent fees, whether in or out of litigation, were made subject to judicial approval of record, such contracts would of necessity be reported to the Court and wisely regulated. If the disposal of the avails of such suits or claims for damages were invested or held subject to the order of the court for the use of the beneficiaries, as is the case in England, the ambulance chaser need no more be feared. Indeed

he might become helpful in aiding the helpless or ignorant from unprincipled claim agents or others and enable the Court to apply the funds to the best interest of the injured or their dependents. In England children have been brought up and educated from these funds.

A SUMMARY

It is thus seen that a reasonable administration of justice does not and has not existed in America; and never will exist until provincial concepts are abandoned and a modern program is inaugurated. The dawning of that day is already at hand. Administration of justice has not advanced with the growth of this great country. With certain statutory amendments or statutory innovations like Code practice it is in principle appreciably unchanged. It has been the subject of experiments by the Congress and Legislatures instead of the result of the scientific efforts of the judges and lawyers who are allowed no part in it, except as witnesses or advocates before Congressional Committees who, until recent years, gave little heed to them. The causes are not hard to find. There has been inherited a bias in favor of the old and a prejudice against anything new that is so deep as almost to stupefy reason and close the ears to petitions for relief. One very distinguished Senator objected *because (1) it might cast some burden on lawyers to learn a new procedure and (2) that a uniform system throughout the country might cause loss of business to some lawyers and (3) a monopoly to others.* There is no ground for these contentions, but the people for whom the courts were created to serve thus became the "unknown man." In the provincial beginning there was no need for promptness; the record of English procrastination and expense prepared the Colonists to expect delay and to suffer it as a necessary evil; the inherited atmosphere of the American Bench and Bar was one of dilatoriness and forensic display, instead of expedition; the faculty for useless technical procedure became so highly developed as to make of it a fetish; it was so emphasized in the law schools as to become a prerequisite to qualification and the basis of professional reputation; the course of justice was blocked by a useless school of highly technical pleaders; pleading and procedure, normally a mere means to an end, became more important than the merits of the case; the lawyers and judges were complacently inactive, and there was no Bentham or Dickens to bestir them to a sense of the rights of litigants. It is thus seen that progress is built upon a provincial past that one is prone reluctantly to push from the mind only when necessity or public opinion drives refractoriness to improvement.

A CONCRETE ILLUSTRATION

Such sentiments should not be expressed without concrete support. In the Virginia case of *Rainbow* v. *Taylor* (2 Hen. & Mun., 423, et seq., decided May 6, 1808) the verdict of the jury against the defendant for personal injuries, negligently inflicted on Rainbow on June 22, 1798, was set aside because the action was trespass on the case instead of trespass *vi et armis.* Ten years were required to dispose of the pleadings. Over eight finely printed pages were required in the discussions. Nationally known judges like Roane and Flemming composed the court, but Flemming eased a boisterous conscience by explaining that (p. 444) "were it not that I feel myself tied down and bound by precedents, I should have differed in opinion. . . ." In our own day, in fact in July, 1926, the Eighth Circuit Court of Appeals, *sua sponte,* set aside a final decree of a district court because

"a court of equity had tried an action at law"! (*Denison* v. *Keck*, 13 Fed. (2nd) 384). It is well-nigh unpardonable that a rivalry once existing between the English law and equity courts, that Jenks ("Short History of English Law," page 357) declared to be a disgrace to English jurisprudence, should now be revived in spite of counsel's apparent agreement to the contrary. Congress undertook to correct this technicality (5 Fed. Stat., Anno., 2nd Ed., p. 106) by requiring the transfer of cases to the equity or law side as the remedy sought might require. In the case of *Liberty Oil Co.* v. *Condon*, 260 U. S. 235, 244 (1922), the Supreme Court liberally interpreted the statute. The recommendation of Chief Justice Taft in 1922, in an address before the American Bar Association (Vol. 47, p. 259) for "one form of action," is now advocated by that great group of lawyers in a bill before the Congress which has been approved by the judiciary Committee of the Senate.

There has been some discussion as to the expediency of burdening the Supreme Court with the rule-making power, but none as to the merit of the proposal. There are two answers. The first is that the lawyers never have and never will agree on a particular form for pleading and practice. They will *accept* the work of the Supreme Court of the United States and bend their best efforts towards making it successful. The second is that the Court will create a commission of lawyers and judges to perform the actual labor under its direct instructions and oversight and maybe Congress will make the commission permanent, as it should. It will be little more onerous in any event than was the labor of rewriting the equity rules. (See the Report of Committee on the Judiciary of the Senate, No. 1174, 69th Cong., 1st Sess., July 1, 1926.)

The Courts of Equity During the Past Few Years

By Andrew A. Bruce
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As far as the substantive law has been concerned, equity has always followed the law, and from the beginning the courts of equity have given relief not merely where there was no adequate remedy at law but, in many instances, have exercised a concurrent jurisdiction with the legal tribunals. Originally even the scope of the common law itself was determined by the chancellor, for it was he who provided the formulae. The common law gave money damages merely or gave judgments for the possession or recovery of property. Equity went much farther. It could require contracts to be performed and prevent the harm which, if done, would involve a suit for damages. It could prevent fraud. It could reform instruments. It could deal with the status as well as afford money relief. Never at any time however, except perhaps in the case of the use, did it entertain any theory of duty or of obligation which was different from that of the common law. It did not try to enforce the law of nature. Under the formulae of trespass on the case and special assumpsit, the courts of law, if they so desired, could have assumed all of the jurisdiction which the courts of equity later exercised. Right was right and wrong was wrong, both in a court of law and in a court of equity. The same criteria of right and wrong existed; the only difference lay in the remedy.

It has always been open to the courts of law to expand their jurisdiction, and although *nisi prius* judges are subject to control by the supreme courts and the supreme courts at times have insisted upon confining them within the narrow limits of the ancient formulae, they have at times allowed them to assume equitable functions and could always do so if they desired. It is a noticeable fact that a separate court of chancery was not established in Pennsylvania until 1835 and that up to that time the courts of common law afforded most if not all of the relief which equity provides. Though, also, the various reformed codes were at first narrowly construed by hostile common law judges so as to be deprived of much of their efficacy, there can be no doubt that in providing for but one form of action and allowing legal and equitable defenses to be jointly pleaded, the authors of these codes intended as far as possible to bring about a merger of the two jurisdictions. This fact is today coming to be more and more recognized, and the rule prevails in most of the code states that where law and equity are blended, equity shall control. In all events, the legislature is paramount and can, if it pleases, give to the courts of law equitable powers. Rarely are the appellate tribunals hostile to such an expansion or assumption.

Expansion of Equity Jurisdiction

A good example of this expansion is furnished by the rule of liquidated damages. At first it was for the courts of equity to announce that equity abhored forfeitures and hardship and, where damages had been liquidated in a manner so that hardship and oppression would be the result, to refuse to enforce the contract of liquidation and insist upon the proof of actual damages.

They made the distinction between an agreement for liquidated damages and an agreement for a penalty, and announced the general rule that all such agreements were penalties and unenforceable if the amount agreed upon was grossly disproportionate to the injury, or if the proof of the actual injury and damages could be easily furnished. It was not long, however, before the appellate tribunals allowed the trial courts to entertain the same ideas, to decline to enforce penalties and to require strict proof of the actual damages in the same manner and to the same degree that they had sanctioned the prerogative in the courts of equity.

When we come to the legislature everywhere we find statutes allowing the trial of cases without a jury and we find statutes authorizing the issuance of subpoenas *duces tecum*. We find statutes allowing the examination of the adverse party before trial, all of which take the place of the equitable remedies furnished by the bill of discovery and the sworn answer.

Of recent years, however, there has been a decided growth on the other side and an expansion of the jurisdiction of courts of equity as opposed to that of the courts of common law, a decided expansion of the use of the writ of injunction, and a decided invasion of the right to a trial by jury. This has been especially noticeable in labor cases and in relation to the sale of intoxicating liquors. As far as labor controversies have been concerned, although there have been many recent illustrations of the same rule and of the same tendency, the decisions in the so-called Debs' case are perhaps the most illustrative. Mr. Debs was indicted at the common law for a criminal conspiracy and for interference with interstate commerce and with the mails, but at the same time was punished for the contempt of an equitable injunction which restrained him from doing the very things for which he had been indicted. In the common law courts he was entitled to a trial by jury, and he escaped punishment on account of the fact that one of the jurymen became sick during the trial and the new trial which was necessitated was never had. In the court of equity, however, he was tried by the judge without a jury and sentenced to prison for contempt.

In relation to intoxicating liquors this jurisdiction has been largely extended by an expansion of the equitable prerogative to abate nuisances. Under the so-called Volstead Act, anyone who sells liquor, keeps or carries it around his person or in any conveyance whatever, or who leaves it in any place for another to secure, is guilty of a nuisance and may be restrained by injunction, temporary and permanent from continuing these acts. Violating an injunction is punished by a fine of not less than $500 nor more than $1000 and imprisonment from thirty days to one year (Sec. 24). All property rights are destroyed in liquor manufactured or sold in violation of the law, and in all property used in manufacturing of liquor for illegal purposes. Any violation of the Prohibition law on leased premises can work a forfeiture of the lease.

NATIONALIZING THE USE OF INJUNCTION

We have then begun to nationalize the use of the injunction. No longer do we look upon the power and the right of a court of equity to punish for contempt solely as a means of maintaining its own dignity and enforcing its own decrees. We have, in fact, made of our courts of equity courts of criminal law. Formerly the court of equity punished as it saw fit and as the maintenance of its dignity required.

Now the duty to punish is positively placed upon it and by legislative mandate it is required to aid in the enforcement of the criminal law.

There can be no doubt that under the earlier law a court of equity could find that a gambling house or a house that was used for the sale of liquor was a nuisance, order the abatement of the nuisance, and punish for contempt if the practice were not discontinued and the nuisance abated. Now, and under the Volstead Act, every such place is positively declared to be a nuisance and a punishment for maintaining it is positively provided, the penalty being not less than $500 nor more than $1000 and imprisonment from thirty days to one year. If found guilty, the minimum sentence, at least, must be imposed upon the defendant and this without the right to a trial by a jury. Formerly, the right to punish for contempt was a judicial prerogative. Now its exercise is a positive duty and the court of equity is a court of criminal law.

The Volstead Act and similar state statutes have everywhere been sustained by both the state and federal courts. If the principle announced and the jurisdiction and duty imposed is sound and constitutional in the case of the nuisance of intoxicating liquors, it is sound and constitutional in the case of all other nuisances. After all, is not every act or practice or thing which is injurious to the public at large a nuisance? Is not the exercise of our so-called police power, which is being expanded in so many directions, merely the exercise of the power to abate nuisances or to prevent them from being indulged in? Why should not statutes similar to the Volstead Act be passed in the case of public service corporations which charge excessive rates, of combinations in restraint of trade, and innkeepers who refuse to harbor colored persons, and in relation to many other offenses? Why, in all of these cases, could not a criminal penalty be imposed and right to a trial by jury be taken away?

We are not arguing against this remarkable extension of equitable duties, and now they are duties and not merely powers. We are calling attention to it simply to suggest that perhaps its creation is the beginning of the overthrow of the ancient jury which, of recent years, has proved so unsatisfactory and so expensive a means of enforcing the criminal law.

Perhaps the exercise and the creation of this new form of equitable duty is necessary. Perhaps it is not new after all, but a mere harking back to what has happened before. There was a limited time in England, indeed, when the courts of equity exercised criminal prerogatives. There was a still longer period in which the Star Chamber functioned as a criminal court. It would be interesting, indeed, to consider the real motives and the real causes which lay behind the English and the American adoption and entrenchment of the theory of the right to a trial by jury. Was not much of the impetus due to the fact that so many cases and so many trials were political in their nature that even the "gentlemen" of England feared the rule of judges who held office by royal appointment and at the royal pleasure? Had they and have we as a people today any solicitude for, or any prejudice in favor of, a jury in what might strictly be called criminal cases? Is there any sympathy for the ordinary malefactor which will prevent the extension of equitable jurisdiction over his machinations?

In any event the barriers which have so long existed between law and equity are being broken down.

The Development of the Family Court

By Honorable L. B. Day
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During the past few years the whole country has been flooded with statistics tending to prove that family life in America is on the verge of such a physical breakdown that the whole future of our social life is in jeopardy. This propaganda, carried on industriously by those who view with alarm any change in our present social order, has created a public demand that something be done by society for its own self-preservation. In response to this insistent demand, there has developed as a part of our judicial system, courts designed and equipped to cope with the intricate and varied problems of family life These courts deal primarily with the social problem, and the purpose of their judgments is to adjust the relationships of family life. For the purpose of this article, domestic relations courts include all those courts whose jurisdiction in whole or in part embraces the hearing and disposition of cases involving the family relationships. This article is not a comprehensive survey of existing domestic relations courts, but rather a discussion of the conditions which contributed to the demand for their creation and the response to that demand.

Juvenile Delinquency

The children who were socially maladjusted first attracted our attention to the need of a socialized court. It was an obvious fact that it was not children who had transgressed the rules of society, and they were not being benefited by their treatment in the criminal courts. In fact, it was generally conceded that the criminal court in the handling of children's cases was doing infinitely more harm than good. The maladjusted child emerged from his contact with the court, more embittered against society, and from his contact with older criminals; prepared and determined to wage a more effective warfare against that society. To improve this situation, the juvenile court had its inception. It was generally a court of equity, and the purpose of its inquiry was to determine what judgment of the court would best serve the interest of the individual child. Then for the first time in the history of our jurisprudence, a court made a scientific inquiry to determine why the individual case had come to its attention. Social investigations became a part of the procedure. Physical and mental examinations were an innovation. Thus this court, inquiring into human motives and taxing human responsibility, had some information about the individual upon which to base its judgment. Heretofore the court had not been concerned with the individual, but was interested solely in one single act of transgression. Then in an effort to exercise a supernatural and infallible power it did not possess, it sought to correct the social order by a terrifying judgment as practically effective as a magician's wand. The courts began to use a system of probation as the most important and effective method of correcting the situation of the delinquent child. They began keeping a system of social and legal records in order that they might study the causes of juvenile delinquency.

JUVENILE DEPENDENCY

The social investigation of these cases often disclosed that what at first appeared to be a delinquent child was in fact a dependent or neglected child. And so the jurisdiction of the court was increased to care for these classes of children. Juvenile courts in many of the states were given funds to administer for the benefit of dependent children. This is commonly administered under the title of "Mothers' Pension Fund." The purpose was to keep the children in their own home, where the parents are proper guardians and it is for the welfare of the child, but where poverty would prevent unless financial aid were given.

ADULT RESPONSIBILITY

Adult responsibility for juvenile delinquency was very soon manifest in the work of the juvenile court by the passage of statutes, giving the court jurisdiction over cases where the delinquent child was involved with an adult. Such statutes are commonly termed contributing to delinquency or dependence of minors and are broad and comprehensive. Their purpose is to protect the juvenile and to make effective probation work with the individual child. They stop the interference of adults, who would encourage and lead children to acts of delinquency. Without these statutes they might do their destructive work and nullify the work of probation officers with impunity. Children are also found to become delinquent because of the neglect of their parents to provide a home and the necessities of life. The juvenile court gradually evolved into a family court. This came about because students of the problem were forced to recognize that not the individual but the family is the unit of society. The father is charged with the duty of supporting the family. If he fails and refuses to support the family, the family fails to function. Family desertion is closely associated with non-support. The deserter leaves his family in addition to refusing to support them. So the family court was given jurisdiction of cases of non-support and desertion. The probation staff of the court can do its most effective work with these cases. They probably already have a contact with the family, because when the family fails to function in any particular, all the members of the family feel the result. The old way of handling these cases placed them in a penal institution. While they were in jail they could not support their families. Only a few of our communities have a work house where an incarcerated person can earn money for his family. Therefore, in most communities such an offender ought to be kept in custody only until willing to accept probation, upon condition that he contribute to the support of the family.

This, in brief, is an outline of the family problems that come before the court. They all have their origin in the failure of family life. The child is delinquent because of the neglect or perversity of his parents. He is dependent because of the failure of his parents to make a home for him. These problems, therefore, depend for their solution upon the success in adjusting the family relations.

DIVORCE A FAMILY COURT PROBLEM

The end desired in these family cases is the rehabilitation of the family, and the family court to justify its existence must work to this goal. When we read that each year in our nation approximately 350,000 people have been freed from the obligations of family life by judicial decree, we can scarcely realize the significance and

the extent of this social phenomenon. There is no other social breakdown attended with so much pathos, so much tragedy and so much interest as divorce and its aftermath. The records of the courts show that in about 40 per cent of the cases there is to be decided the question of the custody of minor children of the parties. We have, on the one hand, the suggestion, as easy as the waving of a fairy's wand, to repeal all statutes permitting divorce. On the other hand, we have the proposal that the institution of marriage is old-fashioned and out of date and that it ought to be abolished. Then we have those who take a middle or compromising position. We have two distinct philosophies of marriage in our country, struggling side by side for supremacy. Both have come to us from traditions of past centuries and are both indelibly impressed upon our social order, and yet they are diametrically opposed to each other. The doctrine that marriage is indissoluble and that once entered into, regardless of conditions, must be endured until death terminates it, is in direct conflict with the idea that marriage is a civil contract. All the divergent and conflicting laws of our different jurisdictions represent the struggle of our people to reconcile these two theories. We have no definite, distinct national theory of marriage represented by our law. It is doubtful if the law can control and regulate the customs of the people with respect to marriage. It is more probable that the marriage customs of the people will in time be reflected by the law. Our problem, therefore, with respect to divorce is primarily a social problem, and only secondarily a legal problem.

These cases from the beginning were tried by courts of equity, and paramount in importance was the division of community property. Certain conditions were set out by the statutes as being sufficient reason for a judicial dissolution, and the question for the court to determine was whether at a time and place named in the complaint the parties did or did not commit one of these specified acts. If proved, then the court proceeded to divide the community property. The bench and bar, perhaps not consciously, generally classify cases as important or unimportant, depending upon the value of the community property. The children in the family had to be disposed of by the decree. In the development of court procedure, in this respect the courts have taken the view, and the law-making bodies have given them the power to decide this phase of the case with the single purpose, to determine what is for the best welfare and interest of the child.

CUSTODY OF CHILDREN IN DIVORCE CASES

While it is the duty of the court to determine the custody of children in divorce cases, with a view to the best interest of the child, the average equity court hearing these cases does not have before it sufficient evidence upon which to base an intelligent finding in this respect. Most of the cases are not contested and while there is usually a formal hearing required, and in spite of statutes against collusion, these cases really amount to divorce by mutual consent. The property rights between the parties again asserts its influence. The husband and father is required by statutes in most states to pay not only his own attorney's fees, but also court costs and attorney fees for his wife's attorney. Unable or unwilling to meet these court expenses, he is not permitted generally to offer testimony in the case. In other cases, the wife and mother may be so morally depraved that she ought not to be

entrusted with the care and custody of minor children; but in order that she may keep them and get a decree of divorce, she refuses to demand that the husband and father contribute to their support, and in return for this consideration he does not contest her case. Thus a bad situation is often made much worse by a lack of sufficient money in the disrupted home. Many members of the legal profession believe that these cases ought to be tried by the old methods in strict conformity with legal procedure. It is true that a case so tried, both parties presenting their evidence, and each represented by competent attorneys, is the best method yet devised for the purpose of ascertaining the truth. But not 10 per cent of all the divorce cases are so tried. The powers of the court are latent and only called into action by the efforts of the parties to the case. The proceeding is too expensive and the social problems involved, particularly in cases concerning children, are too important to the public and the state to be ignored.

PROBLEMS FOLLOWING DIVORCE

Just as desertion and non-support cases, casting their shadows over the home, precede the dissolution of the marital relationship, so also are there problems that follow the breaking of the home. Where there are minor children, there is and can be no such thing as a final settlement of the case until the children have reached their majority. Usually the court places the children in the custody of one parent, with the right of visitation for the other. This is difficult to arrange, and the practical application of this principle calls for the frequent intervention of the authority of the court. When parties, or one of them, remarry the complications increase.

Closely allied with this problem is the payment of money for the support of minor children by the father, when the mother has their custody. Just as non-support and desertion are the man's way to apply economic pressure to his dependent wife in an effort to change conditions to which he objects, so it is the method he continues to use to dominate the situation. It manifests itself in a failure to pay the money provided by the decree for the support of the children. He feels that his divorced wife has not treated him fairly, and filled with resentment and bitterness, he is determined that he is going to make her lot as difficult as possible. When he does make the payments, he does so at irregular intervals. It often requires the persuasive powers of an officer of the court and sometimes the coercive powers thereof to convince him that the payment of even so small an amount as $25.00 per month for the support of two children is not likely to benefit personally the divorced wife. If the mother marries, the father often contends that her new husband ought also assume the burden of his children. This view is more prevalent than generally supposed, and is held by him notwithstanding the fact that he also has remarried. This is one of the most intricate complications caused by the increasing number of divorce cases and makes the matter of divided custody and collection of support money more difficult. The ordinary processes of courts for the collection of judgments is not adequate or effective in this matter. It is too slow and again too expensive. It often requires the services of an attorney to collect this money, and in the case of a wage earner the amount collected is not sufficient to pay the court costs, and certainly not enough to spare for the fees of an attorney.

Probation officers and legal aid organizations have undertaken in a meas-

ure this work. In most states the father can now be cited for contempt and the matter heard and disposed of in a summary manner. The state is interested in this phase because the state must support these children if the father does not. It is also interested because the state must be interested in the kind of home in which the children are reared. The juvenile courts of our cities are filled with cases of dependency and delinquency from broken homes. The divided custody between two antagonistic parents; the lack of proper and adequate support; the necessity of the mother to work outside the home; and the lack of that intangible influence, the pride in family traditions and reputation, cause the broken home to contribute generously to the family problems of a community.

ADOPTION OF CHILDREN

The adoption of children is closely connected with broken homes and the dependency of children. It has been and is still generally a proceeding to take care of the inheritance of the child. In most states it is only a perfunctory proceeding and no investigation in the interest of the child. An application for adoption is made and if no one appears a decree is entered. This gives the adoptive parents, good, bad or indifferent, the right to the custody and control of the child. In the case of unfitness of parents, the juvenile court may remove the child from this adoptive home, but in the language of the Supreme Court of one state, it requires almost as much proof of unfitness to remove the child from adoptive parents as from natural parents. In many states now the court makes an investigation as to the suitability of the adoptive parents before entering the decree.

CHILDREN OF UNWED MOTHERS

Many of these children, who are adopted and many of the dependent children, are born without the benefit of the marriage ceremony. More enlightened and more humane views are now entertained relative to this social problem; for it is a social problem and it ought not to be treated as a legal question for the recovery of a money judgment only. This does not solve the problem. The state has an interest and ought to look after its interest in an intelligent manner. It may be best for the child to remain with the mother, or adoption may be the solution; but it should be decided with a full knowledge of the circumstances in each individual case.

EXISTING FAMILY COURTS

In order to secure a full understanding of the circumstances surrounding family cases of the nature outlined in this paper, and to meet squarely the issues involved therein, the family court has become a reality.

The history of the growth and development of family courts represents the increasing consciousness of the community that these cases are a public responsibility. These cases present social problems that require adjustment, and their solution is a community responsibility. In recognition of this duty, almost every community in the United States, with a population of fifty thousand or more, now has some form of family court to cope with these family problems. Some cities have more highly organized and more efficient courts than others. Some cities have established new courts, with a wide range of jurisdiction over family cases. Others have adapted their existing courts to handle these cases. In some cities all these cases are han-

dled by a unified family court, while in other cities several courts handle various phases of the family disorganization. There is no uniform court organization and almost every court is different; but the method of handling these family cases is usually similar. The growth then of family courts has been through the development of the methods of the treatment of family cases. Rural communities, where the number of family cases is necessarily limited, do not and cannot have a highly organized family court with a staff of trained probation officers, physicians and psychologists. Perhaps they do not need such an institution. In rural communities people do not lose their individuality as they do in an urban center and these problems are dealt with in the spirit of human kindness, if not expertly. Such a course in a city with the vast number of cases is impossible without a trained staff of expert workers.

THE IDEAL FAMILY COURT

There is a great difference of opinion among those who have worked most with these family problems, about the ideal family court. The difference is mostly concerned with the classes of cases which should be made subject to its jurisdiction. It seems to me that the jurisdiction of the family court should embrace all cases in which the family relationship is involved. The family problem seems paramount in all cases involving children, including contributing to delinquency and dependency of minor children; guardianship of the person (but not guardian of the property) of a minor; adoption; securing support for the unwed mother and her child; the adminstration of public funds for the support of dependent children (Mothers' Pensions); desertion, non-support, abusing wife by physical violence; cases for divorce, separate maintenance and annulment. The family court should have exclusive, but not final, jurisdiction of all the cases just enumerated. There ought not to be other courts of concurrent jurisdiction entering judgments upon these cases to conflict with its judgments and thus leave the final determination doubtful and uncertain to the parties. The family court should have a staff of trained probation officers. Effective probation work is the heart and soul of a successful family court. The judge of the court, though not so important as the probation staff, ought to be one interested in the social problems of the family, in addition to all the other generally accepted qualifications for the judicial office. It matters not whether the family court is a specially created court or a division of an existing court but the judge ought to be elected especially for the particular court rather than assigned to the division, in order that he might be in sympathy with the work. The court should have the services of physicians for physical examinations and psychiatrists for mental examinations. In addition to this the court must have the aid and coöperation of all the social welfare organizations operating in the community. The court must know how to use the service of these organizations. And lastly, it is essential that such a court be in close coöperation with the schools of the city, both public and private.

CONCLUSION

How many of our cities have such an ideal family court? Perhaps no such court exists. But the principle does exist and courts are functioning along the lines described. The methods are the best yet devised to meet the

situation. It approaches the adjustment of the family disorganization in a friendly, sympathetic and intelligent manner.

A family court will not by its operation in a community end family disorganization, delinquency, divorce or any of the related problems, but it is a social and legal means whose aim is to rehabilitate the home. And perhaps the greatest service of all is to nullify or modify the social effects of the home that is broken beyond repair.

General Progress in Criminal Procedure

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THE term criminal procedure is usually applied to that body of law and practice which prescribes the manner in which administrative and judicial officers shall act in apprehending persons accused of crime, and the way in which they shall apply the rules of substantive criminal law in determining their guilt or innocence. Criminal procedure is inextricably involved with the laws governing the organization of courts, the selection of officers, and the admission of evidence in criminal cases. It is practically inseparable from the constitutional and statutory provisions defining and limiting the rights, privileges and immunities of accused persons. Under these circumstances, it is easy to understand the faithfulness with which the law of criminal procedure has reflected prevailing popular attitudes concerning crime and criminals. So long as the predominant popular philosophy was that expounded by Blackstone, namely, that it was better that ninety-nine persons should escape rather than one innocent person should be punished, criminal procedure grew increasingly slow and cumbrous, with diffuse pleadings, many motions, long delays and jealously guarded technicalities.

The past half century has witnessed such an astonishing development of new methods and techniques in crime and a constantly mounting national loss as a result thereof that people are becoming more conscious of the society which they constitute and are demanding increased measures of protection for society rather than guarantees of individual freedom. This has again been reflected in changes in criminal procedure.

Criminal Pleadings

One of the first changes to be made was the abandonment of the elaborately detailed indictment of the common law. Portion by portion it has been whittled away, surplusage and repetition have been gradually eliminated, until only a very brief succinct statement remains. Progress in this direction still goes on, as is evidenced by a law enacted at the last session of the California Legislature, which requires that in describing the offense it is necessary merely to allege that the defendant "murdered," or "robbed," or "raped," a certain other person without further elaboration of the details of the alleged offense.[1]

Methods of Initiating Prosecution

An even more important change has come in several jurisdictions with the substitution of the information for the indictment as a method of initiating prosecution. The indictment is an accusation by a grand jury that a

[1] California Penal Code. Section 951.

Form of indictment. An indictment or information may be in substantially the following form: The people of the state of California against A. B. In the superior court of the state of California, in and for the county of———. The grand jury (or the district attorney) of the county of———hereby accuses A. B. of a felony (or misdemeanor), to wit: (giving the name of the crime, as murder, burglary, etc.), in that on or about the ——day of———, 19—, in the county of———, state of California, he (here insert statement of act or omission, as for example, "murdered C. D."). Amendment approved May 18, 1927; Stats. 1927, p. 1043.

certain person has committed a certain crime contrary to the law of the land. The information is exactly the same thing, except that the accusation is made by a duly authorized officer, such as an attorney general or a district attorney. The filing of the indictment, under normal circumstances, follows the arrest and hearing before a magistrate, the commitment or "holding over" for trial, the imprisonment of the accused or his release on bail, the calling and formation of the grand jury, the investigation of the case by the grand jury, usually upon the presentation of evidence by the prosecuting attorney, the grand jury's deliberation, the preparation of the indictment, its signing and its filing with the clerk of the court. The use of the information, on the other hand, requires the taking of the steps outlined down only to the time of the commitment by the magistrate, at which time the prosecuting attorney intervenes, files the information, and proceeds to trial thereon just as he does on the indictment. The vital difference between the two methods lies in the fact that in the first case the grand jury is the body in which final discretion is vested, and in the second the prosecuting attorney, to determine whether a particular person shall be prosecuted for a crime. In 1884 the Supreme Court of the United States decided that the use of the information in felony cases "is due process of law and violates none of the constitutional rights of the accused."[2] This decision, of course, relates only to the guarantees of the Federal constitution. In some of the state constitutions it is still expressly provided that the prosecution of felony cases shall be only upon indictment. In an increasing number of states, however, the shorter, simpler, more convenient and less expensive method of procedure is being adopted. In twelve states by constitutional provision, prosecution in felony cases upon information is expressly permitted. Where the information has been permitted to be used as an alternative to the indictment, it has been found in practice that the information has been substituted in large part for the indictment.[3] In seven other states, in the absence of constitutional prohibition, the use of the information has been developed without express constitutional authorization. In Indiana the legislature has provided for the initiation of prosecution upon affidavit signed by the prosecuting attorney without even a precedent preliminary hearing.

[2] *Hurtado* v. *California* (1884), 110 U. S. 516, 28 L. Ed. 232, 4 S. C. R. 111, 292.

THE PASSING OF THE GRAND JURY

As a matter of fact, the grand jury, itself, no longer serves the purpose for which it was originally intended, namely, a secret inquisition. It has become impossible to use such an unwieldy agency as an investigating and fact-discovering body.[4] The police and the prosecutor have taken over those functions. It has *apparently* become impossible, if it ever was possible, to keep secret the proceedings of the grand jury. The reputation of the individual is probably better protected where the matter is in the control of the prosecutor's office than where the proceedings of the grand jury are broadcast to the world each day in the newspapers. The abandonment of the idea of secrecy in present-day conceptions of the grand jury is evidenced by legislative enactments in some states providing that stenographic reports shall be taken of testimony produced before

[3] "Informations or Indictments in Felony Cases," Vol. 8, *Minnesota Law Rev.*, pp. 379–408.

[4] Attention should be called to the New York Grand Jurors Association which maintains a research staff and publishes a monthly bulletin.

grand juries and copies thereof furnished to indicted persons. The most important remaining function of the grand jury, for which it is being retained even in states which now use the information in large part, is the secret investigation of important cases where the trustworthiness of public officials is in doubt or where powerful political influences are operating to prevent a proper administration of justice. In such cases the usefulness of the grand jury may very well be defeated by requiring that transcripts of testimony be made.

CHANGES IN TRIAL JURY SYSTEM

Another so-called palladium of our liberties, the petty or trial jury, has been drawing an increasing attack during the past quarter century. Many people have urged the abolition of the jury system, and the substitution of a small body of trained officers to determine questions of fact which are now determined by trial juries. During the last few years the use of the jury has been considerably limited. In misdemeanor cases, which in number, at least, constitute a large part of all criminal cases, its use has been abandoned, in many jurisdictions, to a considerable extent. The occasional, leisurely trial in the court of the justice of the peace before a jury of leisurely country folk, has become in modern city life one of a series of rapid-fire, summary proceedings handled with all the expedition and careless observance of proprieties of a bargain basement sale. Consideration of the question whether or not this change constitutes progress is almost beside the point. In view of present-day conditions it has become a practical necessity. It has established itself, apparently without popular protest, and seems to be working out satisfactorily.

In the trial of felony cases, the use of the jury has been more jealously guarded. In some states it is still insisted that a defendant cannot waive his right to trial by jury except by pleading guilty.[5] In Maryland, on the other hand, a large percentage of felony cases are tried without juries upon waiver by defendants.[6] In Michigan the rule was recently changed by legislation to permit such waivers.[7] We may expect further changes in this respect in the near future. The increasing pressures of modern life, and the increasing protest against the uncertainty of jury verdicts seems to require a simpler method of determining fact issues. The unwillingness of many competent persons to serve on trial juries has resulted in an ever lengthening list of classes exempt from jury service.[8]

In a number of states further innovations in jury trial methods have been introduced which would be as shocking to the old common law lawyer as would be the complete abolition of the system. For instance, women have been generally accepted as eligible for jury service. The few preliminary studies which have been made seem to indicate

[5] *State* v. *Smith* (1924), 184 Wis. 664, 200 N. W. 638, 3 *Wis. Law Rev.*, 187.

[6] James M. Hepbron, Managing Director, Baltimore Criminal Justice Commission, Proceedings of Conference of National Crime Commission (Washington, 1927), p. 207; *State* v. *Dobbs* (1925), 148 Md. 34, 129 Atl. 275, 11 *Cornell Law Quart.* 89.

[7] Michigan, Public Acts, 1927, p. 284.

[8] The 1927 legislatures added the following exemptions: Arizona: editors of newspapers, school teachers and other school employees, druggists, undertakers, telegraph operators, railroad station agents, conductors and engineers of railroad companies, express agents and express messengers, Ariz. Laws, Chap. 5; Alabama: rural and city and town mail carriers, Ala. Laws, Chap. 108; Illinois: veterinarians, Ill. Laws, p. 590; Oregon: telegraph operators, Oregon Laws, Chap. 84. The complete lists should be studied in order to appreciate the extent of exemptions now existing.

that this has been a progressive step. It is to be hoped that further research may be made to determine this question more definitely. In a few states provision has been made for the use of alternate jurors who sit with the regular jurors throughout the trial, and who in case of the illness or death of regular jurors, then become members of the jury. The purpose of this innovation is to prevent mistrials. It is obviously a sound procedure. In a few states the interrogation of veniremen and the selection of juries has been taken out of the hands of the trial lawyers and entrusted to the trial judges. The results have been good, juries being selected and sworn in, in some instances, under the new method in only a few minutes, where under the old method days or even weeks have been consumed in this preliminary procedural step.

Practically no improvement has been made in the instructing of juries. In a few instances trial judges have of their own accord conducted classes designed to inform veniremen of their duties if and when chosen as jurors. The formal instructions to jurors are still prepared and given in lawyer's language, necessarily largely incomprehensible to the people who are supposed to use them. This is a field in which careful research work needs to be done.

EXPEDITING THE TRIAL PROCESS

Within the field of procedure generally many minor changes have been made. The end usually sought by these changes is the expedition of the trial process. So we find many provisions shortening the time within which various procedural steps may be taken, as, for instance, the holding of the preliminary hearing, the filing of the information, the setting of the case for trial, the motion for a new trial, the notice of appeal, the taking of the appeal, the filing of the transcript on appeal, the filing of briefs.

THE TRIAL JUDGE

The capacity and integrity of the trial judge have become pivotal considerations in proposed changes in criminal procedure. Fear of his lack of capacity and fear of his politically controlled judgments have made legislatures reluctant to extend his discretionary powers. Frequent comparisons are made of English and American procedures. Frequent suggestions are made that procedural methods in vogue in England should be adopted here. The usual effective answer is that such changes would place too much power in the hands of incompetent trial judges. The assumption seems to be that incompetent judges are inevitable and that changes must wait upon a changed judicial personnel which is in itself impossible. In state courts the trial judge has become more and more an umpire, refereeing a skillfully coached game between contending lawyers and witnesses. Determined efforts are being made to break down the power of trial judges in federal courts, where up to the present time much wider discretionary power has been vested.

THE INTRODUCTION OF EVIDENCE

Few important changes have been made in the laws governing the introduction of evidence in criminal cases. Frequent suggestions have been made for removing the privilege of the defendant not to testify, but they have borne little fruit. In a few instances legislatures have extended the power of the court and the prosecuting attorney to comment upon the defendant's failure to testify. The long-continued demand for improved methods of introducing and using opinion evidence, popularly called "expert testimony," has been largely unanswered.

A few tentative efforts have been made by providing for the calling of experts by the court. A joint committee of the American Bar Association and the American Psychiatric Association is now at work on one phase of the problem. Other groups are similarly engaged on other phases of the problem. The impatience of non-lawyer members of society with our present involved and difficult rules is reflected by the abandonment of many formal rules in the procedures of administrative bodies, such as the various railroad commissions, public utility commissions and industrial accident commissions. A similar result has been obtained in the development of new procedures in juvenile courts.

THE INSANITY DEFENSE

One of the most discussed phases of criminal procedure is that of the insanity defense. The courts are badly divided on the question of what constitute proper legal tests of insanity. The psychiatrists insist that it is a matter which is not susceptible of determination upon a basis of legal tests. They urge that the issue be taken away from juries and decided by experts. The greatest difficulty to be surmounted lies in the fact that insanity disproves the existence of criminal intent which is an essential element of crime. The defendant is entitled to a jury trial of the issue of guilt or innocence and this issue depends on the presence or absence of criminal intent.

In a few states attempts have been made to solve the problem by separating the issue of insanity and the other issues. By requiring a separate plea of insanity and providing that it shall be tried separately, it is hoped that the confusion which is now caused by a joint trial of both issues may be avoided. The problem, however, is much larger than is suggested by these attempted solutions. The larger problem is discussed in another article in this series so will not be developed further in this one.

PROCEDURE ON APPEAL

Some progress has been made in connection with appeals in criminal cases. The time involved has been cut down to some extent; the record on appeal has been simplified and reversals for immaterial technical errors have been considerably reduced. Appeals by the state are now allowed in a number of jurisdictions, although the state is usually limited to appeals on questions of law which, even though successful, do not have the effect of bringing accused persons back for trial.[9]

JUVENILE AND COURTS OF DOMESTIC RELATIONS

One of the most outstanding improvements in the field of criminal procedure has come with the development of the juvenile court. This is also peculiarly a phenomenon of the last quarter century.[10] The philosophy of the juvenile court idea rejects the concept of crime as applied to the juvenile offender and insists upon an entirely new procedure. As a result, it is perhaps improper to refer to the new procedure as *criminal* procedure. However, the changes which have been made are at least suggestive of weaknesses in the old procedure and prophetic of future changes. When we stop to consider that juvenile court procedure has, to a large extent, eliminated trial by jury and the formal rules of evidence, the sweeping change which has been made is clearly apparent. What results is an administrative rather than a judicial procedure.

[9] "Appeals by the State in Criminal Cases," Vol. 36, *Yale Law Journal*, 486–512.

[10] Herbert H. Lou, "Juvenile Courts in the United States," p. 13, et seq.

Many suggestions have been made for an extension of the juvenile court methods, and in a few instances, such as the so-called Family Court or Court of Domestic Relations of New York City, Chicago, Cincinnati, Boston and Philadelphia, there has appeared a tendency toward such an extension.[11] One of the most valuable features of the juvenile court is the use of psychiatric, medical, and other techniques, to determine the nature and cause of delinquency and to suggest intelligent treatment. This assumes a study of the offender as a problem case, rather than a study of a limited fact situation to determine whether the accused committed a certain prohibited act. There is no sound reason why the same method should not be used in the case of the adult offender, even though the issue of guilt or innocence be retained and tried by a judicial procedure. Sooner or later the same method will be adopted and integrated with our present judicial procedure in the criminal courts generally.

PROBATION

The recent very great increase in the use of probation is in itself a recognition of the desirability of the juvenile court method. At the present time it is being very loosely administered, largely as a result of conflicts between judicial and administrative Methods. This subject is discussed in another article in this series and will not be further elaborated at this point.

THE COMPROMISE OF CRIMINAL CASES

Recent years have seen an astounding increase in the compromising of criminal cases by police officers and prosecutors.[12] The extent to which pleas of guilty to lesser offenses are accepted in order to avoid prosecution and conviction is being revealed by crime surveys. Whether or not this is "progress" can, as yet, hardly be stated. That it is susceptible of gross abuse cannot be denied; that it is apt to result to the advantage of rich or powerful men and to the disadvantage of poor men is equally apparent. On the other hand, it cannot be denied that some substitute method of disposing of criminal cases is essential. Judicial determination of misdemeanor cases has been largely abandoned. Insistence upon judicial determination of felony cases has produced a widespread system of compromise. Out of it will probably come an administrative method of adjustment, modeled on the general principles of juvenile court procedure.

ORGANIZATIONS AND ACTIVITIES

The great interest of the present day in the administration of criminal justice is evidenced by the number of organizations which have undertaken the improvement of present methods Crime commissions or committees designed to improve criminal procedure have sprung up in a number of states, some of a voluntary character, some appointed by governors, some created by legislatures. State session laws reveal a large grist of legislation.[13] In California alone fifty-five changes in criminal procedure were made by the 1927 legislature. This count does not

[11] Charles Zunser, "The Domestic Relations Courts," ANNALS of the Am. Acad. of Pol. and Soc. Sci., Vol. CXXIV, pp. 114–125 (March, 1926).

[12] "The Compromise of Criminal Cases," Vol. I, *Southern California Law Review*, pp. 1–32; "A Judge's Attitude Toward the Compromise of Criminal Cases, Vol. I, *Southern California Law Review*, pp. 151–158.

[13] "Activities of Bar Associations and Legislatures in Connection with Criminal Law Reform," Vol. 18, *Jour. of Crim. Law and Crim.*, pp. 378–383.

include a number of repealed sections. The National Association of Legal Aid Organizations is largely responsible for the spread of the movement to provide voluntary or public defenders.[14] The Commissioners on Uniform State Laws have contributed a uniform act for the extradition of persons charged with crime,[15] and this act has already met with approval in three states.[16]

[14] See symposium upon the subject in Vol. CXXIV, ANNALS of Am. Acad. of Pol. and Soc. Sci. for March, 1926.

[15] Handbook of the National Conference of Commissioners on Uniform State Laws, 1926, pp. 585–600.

[16] 1927 Laws: Idaho, Chap. 29; Pennsylvania, Chap. 195; Utah, Chap. 61.

MODEL CODE OF CRIMINAL PROCEDURE

The most promising piece of work yet undertaken is that of the American Law Institute in the preparation of a model code of criminal procedure. Dean William E. Mikell and Professor Edwin R. Keedy, both of the School of Law of the University of Pennsylvania, are the draftsmen of this code. They are being assisted by an advisory committee composed of judges, lawyers and law professors. The work is being done with great care. None of it is yet ready to be submitted to the public, although several chapters will be ready for submission to the Council of the Institute at its next annual meeting.

"Notes on the Defender in Criminal Cases"

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AT eight o'clock on the morning of February 21, 1431, there was assembled in the Chapel Royal of the Castle of Rouen a court consisting of a bishop and forty-two assessors intent upon the prosecution of a case against a young girl, Joan of Arc. Historians agree that there was little disposition to acquit the accused and the records of the questions and answers indicate that all the subtilty of the learned Doctors of Law was directed to entrapping her into statements, or confessions, from which her guilt might be decreed.

For our purposes the significant fact about the trial is that she appeared without counsel. Lohier, a celebrated legal authority of the time, gave his opinion that the trial was a nullity because no counsel was allowed the defense. It appears that according to the Directorum Inquisitorum, the decretal on the treatment of heretics empowered the judge of the inquisition acting conjointly with the advocate to dispense with counsel for the accused.[1]

It also appears that at this trial the judges were so afraid that Lohier would invoke the assistance of the Pope at Rome to declare the trial a nullity that almost at the end of the trial the prisoner was asked if she desired counsel. She replied, as perhaps was natural at that stage of the affair, "As to the counsel you offer me, I thank you too, but I have no intention of departing from the counsel of God." [2]

[1] "Jeanne d'Arc," by T. Douglas Murray, McClure Phillips & Company, 1902, p. 339, Appendix, Introductory Note to the trial.

[2] "Joan of Arc," by C. M. Stevens, Cupples & Leon Company, 1918, p. 230.

The verdict of history on the trial has been that it was unfair.

Two and a half centuries later in Rome Count Guido Franceschini murdered his wife, Pompilia, and her parents, Pietro and Violante Comparini. His justification lay in the fact that the wife had either eloped with, or been seduced by, one Caponsacchi. Browning's version of this story has been revised by "The Old Yellow Book" of Judge Gest,[3] and in the light of the facts we see a petty family quarrel ending in a murder and the subsequent trial of the murderer in January, 1698.

For our purposes it is interesting to note that at this trial Guido, who was a much less heroic and saintly figure than Joan of Arc, was defended by the procurator and the advocate of the poor. The trial was according to the Roman civil law. Judge Gest tells us with reference to the defense by public officials of persons accused of crime:[4]

> This aid was provided by law. The duty was indeed incumbent upon every advocate where the public office did not exist or was vacant; to refuse this aid was in the opinion of some theologians a mortal sin, and in this life was ground for what we should call disbarment.

As one reads Judge Gest's book one is impressed with the fact that here was a fair trial and that even though the accused was found guilty he had every assistance which the law and extremely capable counsel could afford him.

[3] "The Old Yellow Book," by John Marshall Gest, Chipman Law Publishing Company, Boston, 1925.

[4] Pp. 39, 40.

Any discussion of the defender in criminal cases is necessarily predicated upon the difference in the fairness of trial in the two illustrations just given. Here were two persons, each accused of serious offenses. Each trial resulted in a conviction and execution of sentence of death. Yet in one case by decree of court it was established twenty years later that an injustice had been done. In the other case the trial was fair. Some countries have become accustomed to the principle that a fair trial is one in which the accused is represented adequately by counsel. In other countries the criminal trials, although conducted in a far different spirit, provide no more aid to the accused than was the case with Joan of Arc in the year 1431. Whether or not the ultimate desideratum of a fair trial is achieved depends upon criminal procedure—the mechanics of the trial.

PROGRESS OF CRIMINAL PROCEDURE

It will be profitable to consider briefly the general progress that this idea has made in criminal procedure. Sir Frederick Pollock[5] has this to say about the stages in the progress of criminal procedure:

> First, revenge approved as no more than adequate, or disapproved as excessive, by rough public opinion, and, even when deemed legitimate, constantly leading to reprisals and fresh feuds; next, revenge limited by customary rules and tempered by the alternative of accepting compensation of a fitting amount; then a rule compelling the injured party, or his kindred if he was slain, to be content with compensation on a proper scale if duly tendered and secured; then the addition of punishment, or substitution of punishment for compensation, turning the avenger into a prosecutor who must hand over the business of execution to public authority; finally the staying of the private avenger's hand and the repression of crime by direct application of the power at the disposal of the state.

What strikes us as particularly interesting in this country is the fact that criminal procedure on the continent developed in one fashion while criminal procedure in England developed another way, and that apparently there are present in our modern system in the United States elements from both English and continental sources.

PUBLIC CONTROL

The public control of prosecution and defense in criminal cases developed slowly in Anglo-Saxon countries, possibly because of the vitality of the jury trial. In England down to the last fifty years[6] there was no public prosecutor. The Attorney General represented the King, but other prosecutions were almost always at the hands of the injured party who hired his own attorneys to prosecute. The case was very much like a civil case.

As a practical matter even today the prosecutions rest largely upon the police officer, or the magistrate's clerk.[7] There is evidence that as late as 1825 an inquest jury was called upon to provide the sinews of the prosecution for certain kinds of offenses, at least in the city of London.[8]

Today in England there is a Director of Public Prosecutions who is assigned by the Attorney General to supervise criminal proceedings, but his main task consists of giving advice and assistance to either officers of police, clerks to justices and other persons, whether

[5] *Harvard Law Review*, November, 1899, Sir Frederick Pollock, p. 177, "The King's Peace in the Middle Ages."

[6] Statute of 42 and 43, Victoria, Ch. 42, S. 2, 1879, established the Public Prosecutor.

[7] *The Law Magazine and Law Review*, No. 15, Second Series, 1863, p. 347, "Criminal Procedure and Public Prosecutors."

[8] "Inquest Jurymen," by Joseph Newell, 1825.

officers or not, concerned in any criminal proceedings.[9]

Under a system of this kind where there was substantially no public prosecutor the idea of public counsel for the defense might not have been impressed very strongly on peoples' minds. And yet so strong was the desire for fair play that we find a well developed progress in favor of giving the accused opportunity to defend himself even in cases of grave importance. This development under English law may be summarized.

Under the Treason Act of 1695 counsel were allowed defendants. This right was further extended by the Trials for Felony Act of 1836. The Criminal Prosecution Act of 1865 and even more so the Criminal Costs Act of 1908 advanced the situation. The culmination of the progress in this direction is to be noted in the Poor Prisoners' Defense Act of 1903 [10] where the prisoner becomes entitled to have a solicitor and counsel assigned to him at public expense.[11]

In 1904 rules were made by the Attorney General for the poor persons' defense and these rules were further revised by an Act presented May 9, 1921, which failed to pass.[12] Under the general reform should be included the Criminal Evidence Act of 1898 and the Court of Criminal Appeal Act of 1907.[13]

FRENCH PROCEDURE

In contrast to the English procedure the French idea crystallized much earlier. The public prosecutor came to light in the thirteen hundreds deriving his power first as a king's procurator, or a procurator fiscal of the lords. At that time the principle of representation in courts of law was not recognized.[14]

Shortly thereafter the procedure developed to the point at which there were two methods of trial: the "ordinary" and the "extraordinary." The "ordinary" trial took place in public, did not employ torture, and allowed the accused an unfettered defense. Extraordinary procedure involved torture, secrecy, and the limitation of the defense. In the struggle between the King and the church, and the King and lords, the accusatory method became very popular, and with it the "extraordinary" methods of trial. Even this method for a long time allowed the accused to defend himself, or to have others defend him.[15]

Beginning with the fourteenth century the rights of the accused were somewhat limited, but he still had the right of counsel. The Ordinance of 1539 prohibited counsel (Article 162) and the judge became the interrogator while the public prosecutor superseded the private prosecutor. The great Ordinance of 1670 appeared to establish this system of trial as a permanent one, but beginning with the seventeen hundreds there came a demand for fair play in the trial of cases which resulted in amendments to the Ordinance of 1670.[16]

In 1789 the representatives elected from the various parts of France for the Assembly of the States General brought with them portfolios, or cahiers,—

[9] "The Laws of England,' by Halsbury, Vol. IX, pp. 292, paragraphs 602. 603, and 313. See also 52 Legal Observer 367 (1856) for discussion of situation and plan for a public prosecutor.

[10] 7 Edward VII, C. 23, S 1.

[11] See Halsbury, *supra*, and at pp. 352, 371, 373.

[12] Report of Committee on Public Defenders of the Canadian Bar Association presented at Quebec, July 6, 7, 1924.

[13] "The Law and the Poor," by Sir Edward Parry, p. 194.

[14] "The History of Continental Criminal Procedure," Vol. V, Esmein, The Continental Legal History Series, p. 114.

[15] *Ibid.*, p. 151, et seq.

[16] "The History of Continental Criminal Procedure," Vol. V, Esmein, The Continental Legal History Series, p. 398.

instructions from the citizens to their representatives. Among these appear provisions that the accused should be allowed the aid of counsel, that the judicial defender should be assigned at the beginning of the criminal action, or during its course. The Decree of 1789 confirmed the publicity of the procedure and the aid of counsel. The judge was given colleagues who personified the public and took the place of counsel. The law provided that if the accused is not able to have counsel of his own the judge will appoint one for him on pain of nullity. The accused, even when absent, could be represented by his counsel who could speak and lodge pleas in his defense.[17]

For a time thereafter men's minds went to the English procedure as their model and in developing the jury system they seemed to have forgotten temporarily both the public prosecutor and the defender, but the Code of 1808 contains the provision, Article 294, "The President ought to warn him that he has the right to contest the validity of the decree of 'renvoi' before the court of cessation, ask him if he has chosen a counsel for his defense, and, if need be, assign him one officially." [18]

The law of January 30, 1851, provided for a defense counsel before the Court of Correctional Police and indicated the necessity of supplying counsel to the accused even though he could not pay for it.[19]

DEVELOPMENT IN THE U. S.

This rough, and admittedly inadequate, survey of the development of the public prosecutor and the public defense brings us to the present time. The public prosecutor exists under our Federal Government and under the government of all our states although his title may vary somewhat. There has been a curious reluctance to work out the defender organization although the models from which our system arose indicate its desirability, and we might say, its inevitability. It is interesting to note, for instance, that the system of defense was in effect from early days in Scotland,[20] and there are evidences of it under the laws of various nations.[21]

When the accused can afford counsel the machinery works fairly well. When the accused cannot afford counsel then the trial is unfair, unless such counsel is supplied without cost.

When we consider the growth of criminal procedure in this country it is, of course, clear that the settlers brought their ideas with them from the mother country. The English model superseded the others in the colonial period. The primary concern seems to have been the prosecution.

In this respect we apparently adopted something of the French and something of the English manner of trial.

Attorney Generals of the English type were well known in this country even in the early days, but it does not appear clearly just what their jurisdiction was.[22]

The most natural point at which to look for striking developments would be in connection with the establishment of the federal judicial system after the adoption of the Constitution in 1789.

[17] "The History of Continental Criminal Procedure," Vol. V, Esmein, The Continental Legal History Series, pp. 404 and 406.

[18] *Ibid.*, p. 511.

[19] *Ibid.*, p. 537.

[20] Keedy, "Criminal Procedure in Scotland," American Institute of Criminal Law and Criminology Bulletin, No. XI (1913), p. 11. "Justice and the Poor in England," by F. C. G. Gurney-Champion, p. 168, George Routledge & Sons (1925). But compare Judge Parry, "The Law and the Poor," p. 190.

[21] "The Public Defender," by Goldman, Knickerbocker Press, New York, 1919, p. 9, et seq.

[22] Report of the Crimes Survey Committee of the Law Association of Philadelphia, 1926, p. 85.

On September 21, 1789,[23] there was passed by Congress an Act "to establish the Judicial Courts of the United States." Section 35 of that Act makes three distinct provisions:

(1) "That in all the courts of the United States the parties may plead and manage their own causes personally or by the assistance of such counsel or attorneys at law as by the rules of the said courts respectively shall be permitted to manage and conduct cases therein."

This has the earmarks of the English system with the added assurance indicated in some of William Penn's statements.

(2) "And there shall be appointed in each district a meet person learned in the law to act as attorney for the United States in such district, who shall be sworn or affirmed to the faithful execution of his office, whose duty it shall be to prosecute in such district all delinquents for crimes and offenses cognizable under the authority of the United States and all civil actions in which the United States shall be concerned except before the Supreme Court in the district in which such court shall be holden."

(3) The last part of the section establishes the office of Attorney General.

The district attorney thus established is at once seen to be different in some respects from the Attorney General known to English law.

"Under the Common Law, as stated in Blackstone's Commentaries, Book IV, Sec. 309, the powers of the Attorney General as is claimed for the district attorney, seem to have been limited to those cases where its exercise was absolutely necessary to the preservation of the authority of the sovereign." (*Com.* vs. *English*, 11 Philadelphia Reports, 439.)

[23] Approved September 24, 1789.

The model, or source, of this idea of the district attorney whose duty it is to "prosecute . . . all delinquents for crimes and offenses," is not entirely clear.

There are at least three hypotheses. It seems likely that a part of the duties of the office came from continental models, particularly those of France with which many public men in America were undoubtedly familiar.

A second hypothesis suggests the personal influence of Oliver Ellsworth, to whom credit is given for framing the judiciary bill. Brown's "Life of Ellsworth" (page 51) records that from 1777 to 1785 Ellsworth served as State's Attorney for Hartford County, Connecticut. It is possible that his personal experiences in this position brought home to him the desirability of a more specific statement as to the duties of a district attorney whether he represents a county or otherwise.

The case of *Fletcher* vs. *Merrimac Co.* (71 N. H. 96 (1901)), while it discusses New Hampshire rather than Connecticut law, seems to bear out the idea that a New England county attorney had from the first some prosecution work. But even here the court remarks that it was not until 1842 that an attempt was made to define the duties of the Attorney General in the words, "The Attorney General shall prosecute all indictments and informations . . . ," etc.

The third hypothesis is that the duties of the Attorney General and his deputies were admittedly vague and time brought greater demands for the prosecution of offenses until public opinion required a specific statement of duties in this regard. Certainly the duties of district attorney or prosecuting attorney implying a public prosecutor of crimes made its way slowly. It was known by statute in Indiana in 1824 (*State* vs. *Ellis*, 184

Ind. 307, 1915–16); by the Constitution of 1851 in Maryland (*Hawkins* vs. *State*, 81 Md. 306, 1895) by a statute in Pennsylvania in 1850 (Act of May 3, 1850, P. L. 654). Prior to that time the Attorney General and deputy attorney generals appear to have discharged some of the duties. It is likely, however, that the prosecution of crimes soon became in this country a well recognized public duty.

The whole subject of the growth of the public prosecutor requires greater study than is possible here. From whatever sources it arose it certainly developed and is now more like the French than the English system in some respects. It seems reasonable to assume that the growth of a public defender would follow rather than precede that of a public prosecutor.

THE DEFENDER

The progress of the idea of the Defender in criminal cases in this country has been, as is the case of so many of our institutions, from principle to practice, and through trial and error to a machinery which in practice works well. That this machinery is not as yet universally accepted makes it all the more interesting.

The first step in this country was the enunciation of the principle of fairness.

William Penn provided in 1696 in one of his various sets of instructions for the governing of his Province of Pennsylvania that "all criminals shall have the same provision of witnesses and counsel as their prosecutors."

In 1787 the Federal Constitution provided, Article 6 of the Amendments, "in all criminal proceedings the accused shall enjoy the right . . . to have the assistance of counsel for his defense."

Following this, the various state constitutions provided for the accused right to counsel in terms similar to that of Pennsylvania, Art. I, Sec. 9: "In all criminal prosecutions the accused hath a right to be heard by himself and his counsel." [24]

BEGINNING OF EXPERIMENTATION

The second step in the progress of this idea was to provide a means of giving practical effect to the principle. It is here that the experimentation began. People thought that the Bar would care for this work as a part of its professional duty. In one case (C1) *Commonwealth* vs. *Ramuno*, 16 Dist. Rep. (Pa.) 449, quoting (*Wayne Co.* vs. *Waller*, 90 Pa. 99) counsel had been assigned to represent the accused and demanded compensation for his services. The court in refusing such compensation said that to make such pay-

[24] Note the following provisions taken from Digest of State Constitutions, prepared by the Legislative Drafting Research Fund of Columbia University (1915), page 305:

"Suitors may prosecute or defend cases personally or by counsel. (Mich. II 12; Wis. VII 20.)

"All persons have right, in civil cases, to prosecute or defend in person or by counsel. (Ala. I 10; Ga. I Sec. I 4; Miss. III 25; Utah I 11.)

"Accused to have assistance of counsel in his defense. (Ala. I 6; Ariz. II 24; Ark. II 10; Cal. I 13; Colo. II 16; Conn. I 9; Del. I 7; Fla. D. R. 11; Ga. I Sec. I 5; Ida. I 13; Ind. I 13; Ill. II 9; Iowa I 10; Kan. B. R. 10; Ky. 11; Me. I 6; Md. D. R. 21; Mass. Pt. I 12; Mich. II 19; Minn. I 6; Miss. III 26; Mo. II 22; Mont. III 16; Nebr. I 11; Nev. I 8; N. H. I 15; N. J. I 8; N. M. II 14; N. Y. I 6; N. C. I 11; N. D. I 13; Ohio I 10; Okla. II 20; Ore. I 11; Pa. I 9; R. I. I 10; S. C. I 18; S. D. VI 7; Tenn. I 9; Tex. I 10; Utah I 12; Wash. I 22; W. Va. III 14; Wis. I 7; Wyo. I 10.)

"Any person has right to be heard by counsel in criminal cases. (Vt. I 10.)

"Accused to have 'such reasonable assistance,'" of counsel in prosecuting an appeal, as may be necessary. (Mich. II 19.)

"Accused to have opportunity to be present in person and with counsel at taking of deposition. (Ohio I 10.)

"Accused to have right to appear in person and by counsel in taking depositions of witnesses; if he has no counsel judge to assign him one in that behalf only. (Colo. II 17.)

"In capital cases accused has right to see counsel at proper seasons. (Del. I 12.)"

ment "would be a departure from a time-honored custom to the contrary, and it is not difficult to foresee the mischief to which it would lead. It is far better to let such cases rest on the foundation which has hitherto sustained them—human sympathy and a just sense of professional obligation. No poverty-stricken prisoner is ever likely to suffer for want of necessary professional or pecuniary aid."

George Sharswood, the great Chief Justice of Pennsylvania, in his "Professional Ethics" (1869), page 153, expressed the same idea, but in a less positive manner when he said:

> It is to be hoped that the time will never come at this or any other bar in this country, when a poor man with an honest cause, though without a fee, cannot obtain the services of honorable counsel in the prosecution or defense of his rights.

There seems to have been at one time a pretty wide spread idea that the system whereby the court assigned counsel to represent the accused was the complete answer to the situation of a fair trial.

In certain states the practice of assigning counsel is still customary. In some laws no provision is made even for payment to such counsel.[25]

The inadequacy of this situation to meet the actual needs is startlingly brought out only by an investigation as to the facts.

In a recent (1926) survey made in Chicago, 1095 cases were examined and 505 defendants, substantially 50 per cent of the number, were found not to be represented by counsel.[26] The courts examined were the Criminal Court of Cook County and the Municipal Court, and the cases were taken at random consecutively.

While it is going pretty far to assume a widespread need on the basis of one illustration there would seem to be grounds for a fairly shrewd guess that the practice of assigning counsel is often honored by the breach rather than by the observance. We may set it down as likely that at the present day professional pride does not provide a solution in all cases, at least in our large cities. This should not be taken as a reflection on our bar. It merely indicates that times have changed and new remedies are needed.

COMPENSATION

The next step was to provide compensation for counsel thus assigned. This, it was believed, would make attractive to members of the bar the duty of representing indigent defendants. The laws of the states make very general provision on this score, particularly in capital cases.[27]

[25] United States, Barnes' Federal Code, 1919, Sec. 1438; Code of Alabama, 1923, Vol. II, Sec. 5567; Revised Statutes of Arizona, 1913, Penal Code, Sec. 968; Arkansas, Crawford & Moses' Statutes, 1921, Sec. 3051; Revised Code of Delaware, 1915, Sec. 3794; Clark's Annotated Code of Georgia, 1914, Vol. VI, Penal, Sec. 8; Jones and Addington's Annotated Statutes of Illinois, Vol. II, Sec. 4119; Smith-Hurd, Revised Statutes, 1925, Criminal Code, Ch. 38, Sec. 730; Kansas, Revised Statutes, 1923, Secs. 62–1304; Kentucky —no law found, unless the Act of May 27, 1892, relating to costs, Sec. 884, applies; Louisiana, Revised Statutes, 1920, Wolf, Vol. I, Sec. 992; Mississippi, Hemingway's Annotated Code, 1917, Sec. 1239; Missouri, Revised Statutes of 1919, Sec. 3957; New Mexico, Codification, 1915, No. 4467, Sec. 401; North Dakota, Compiled Laws of 1913, Vol. II, Sec. 10, 721; Oregon, Laws of 1920, Olson, Vol. I, Sec. 1463; South Carolina, Code of 1912; Criminal Code, Ch. 4, Secs. 64–68, Ch. 5, Sec. 76; South Dakota, Revised Code, 1919, Vol. I, Sec. 4410; Tennessee, Thompson's Shannon's Code, 1917, Secs. 7169–7170; Texas, Revised Criminal Statutes, 1925, Criminal Code, Art. 494; Utah, Compiled Laws of 1917, Sec. 8871; Washington, Pierce's Code, 1919, Vol. II, Sec. 9170; West Virginia, Barnes' Code, 1923, Ch. 159; Wyoming, Compiled Statutes, 1920, Ch. 469, Sec. 7480.

[26] Report of the Legal Aid Committee of the Pennsylvania Bar Association, 1927.

[27] In the following states the law provides specifically for the payment of counsel assigned

In some states the protection is accorded to persons accused of felonies where capital punishment is not involved, as in the following: California, Colorado, Connecticut, Idaho, Iowa, Maryland, Minnesota, Montana, Nebraska, Nevada, Ohio, Oklahoma, Rhode Island, Vermont, Virginia.

In some states the law even provides paid assigned counsel to persons on trial for misdemeanors, as in the following: California, Colorado, Idaho, Minnesota, Montana, Nevada, Oklahoma, Wisconsin.

to represent poor persons accused of capital offenses:

California, Deering's Penal Code of 1923, Sec. 987; Deering's General Laws of California, 1923, Vol. I, Act of 1910; Colorado, Compiled Laws of 1921, Secs. 7117 and 7118; Connecticut, Public Acts, 1921, Ch. 129; Public Acts, 1923, Ch. 122; Florida, Revised General Statutes, 1920, Sec. 6070; Idaho, Compiled Statutes, 1919, Vol. II, Secs. 8858–9; Indiana, Burns' Annotated Statutes, 1926, Vol. I, Watson's Revision No. 2248; Iowa, Code of 1924, Secs. 13,773, 13,774, 13,775; Maine, Revised Statutes, 1916, Ch. 136; Maryland, Bagby's Code, 1925, Art. 26, Secs. 7–8; Massachusetts, General Laws, 1921, Vol. II, Ch. 277, Secs. 47 to 56, inc.; Michigan, Compiled Laws, 1915, Vol. III, Ch. 264, Secs. 15,623, 15,911–14; Minnesota, General Statutes, 1923, Secs. 9957–63; Montana, Revised Code, 1921, Vol. IV, Secs. 11,886–7; Nebraska, Compiled Statutes, 1922, Secs. 10,105–6; Laws of 1919 and 1921, Ch. 115. Nevada, Revised Laws of 1912, Div. 7085, Sec. 235; Div. 7540–1; New Hampshire, Public Laws, 1926, Vol. II, Ch. 368; New Jersey, Revision of 1898, Compiled Statutes of New Jersey, Vol. II, paragraph 1838, Sec. 56; New York, Gilbert's Criminal Code, 1925, Criminal Procedure 308; Laws of 1893, Ch. 521; Laws of 1897, Ch. 427; North Carolina, Consolidated Statutes, 1919, Vol. I, Ch. 12, Sec. 496; Consolidated Statutes, 1919, Vol. I, Secs. 4515–16; Ohio, General Code, Page & Adams, Vol. VI, Secs. 13,617–18; Oklahoma, Compiled Statutes, 1921, Vol. I, Sec. 2929; Pennsylvania, West Publishing Company, Statutes, 1920, Secs. 8165–6; Rhode Island, General Laws 1923, 6363–4, Secs. 69–70; Vermont, General Laws, 1917, Ch. 122, Secs. 2496, 2539, 2555, 2568; Virginia, Code of 1924, Ch. 136, Sec. 3518; Code of 1924, Sec. 4970A; Wisconsin, Statutes, 1923, Vol. I, Trials, Chapter 357; Sec. 4713.

Many people feel that this creates an ideal condition and that a fair trial is assured. In some places there has been for some time the knowledge that even here was room for improvement. One set of objections is based on the type of attorney to whom cases were assigned in actual practice.

Mr. Pfeiffer, formerly counsel for the Voluntary Defenders' Committee of the New York Legal Aid Society, states the reason why New York City, which had a system of paid assigned counsel, found it necessary to establish a different machinery to care for the cases. He says:

> Certainly the Voluntary Defenders' Committee, when it started, was based upon a conviction that the situation in the court of General Sessions in New York City was one where it was obvious, irrespective of any given case, that the administration of criminal justice was faulty. The lawyer who was assigned to a case was a man who, upon inspection, was not a proper person to stand up and act as counsel for a man accused of crime. In our particular situation here, it was the opinion of practically every judge, of every public official, of the ex-assistant district attorneys who had tried cases in the court, that the system of assigned counsel, indiscriminately assigning lawyers who were hangers on in the court of General Sessions—was totally inadequate.[28]

This is one serious objection to the system of assigned counsel.

The other objection to the system even though the attorneys assigned are paid for their work, arises from the different attitude which many people have toward persons accused of crime. This change may be briefly illustrated by the following statement as to the criminal:

> He used to be looked upon as possessed by the devil. Today he is regarded as an

[28] "Record of Proceedings at the Fourth Annual Meeting of the National Association of Legal Aid Organizations," pp. 26 and 27.

imperfectly constructed creature who cannot safely be left at large if his defects cannot be set right.[29]

Under the modern point of view, it is not sufficient to find out whether or not the prisoner is guilty. We must also learn what is to be done with him. This depends upon facts and experience in dealing with these facts. Both the facts and experience cannot be secured adequately unless we have a special machinery for collecting and interpreting them. The assigned counsel system, even though counsel are paid, provides no method of gathering and studying the facts beyond the question of guilt or innocence. Consequently under such a system it is not possible to check up and correct the mistakes of treatment of prisoners nor to learn much about the case even in a legal way.

With such problems facing them some states have taken a further step. For the sake of efficiency they have consolidated the work into a single office known as the Public Defender.[30]

[29] "Lycurgus," by G. S. P. Haynes, E. P. Dutton & Co. (1926), p. 23. "Need for Coöperation between Lawyers and Psychiatrists in Dealing with Crime," *Journal American Bar Association*, October, 1927, p. 551, by Dr. William A. White.

[30] In the following states the laws provide for a Public Defender: California, General Laws, 1923, Vol. I, Deering, Act 1910 (approved May 24, 1921, Stats. 1921, p. 354); Connecticut, Public Acts 1921, Ch. 129 (Special Session 1920. Established in Hartford, New Haven, New London, Fairfield, Windham, Litchfield, Middlesex, Tolland,—see "Public Defender," by Kenneth Wynne, *Journal Criminal Law and Criminology*, Vol. XVII, No. 3, November, 1926, p. 359); Minnesota, General Statutes, 1923, paragraph 9957 (in operation in Minneapolis); Nebraska, Compiled Statutes, 1922, paragraphs 10,105, 10,106 (in operation in Omaha); Tennessee, Private Acts, 1917, Ch. 69 (in operation in Memphis); Virginia, Code of 1924, paragraph 4970a (reported in operation in Norfolk).

In New York and Chicago similar organizations exist.[31]

They are supported not by public funds but by private contributions and are therefore not public but private defenders. Their work is similar to that of the public officials.

This last machinery gives us a model by which to fill the need at present. It insures a fair trial which is the essential thing. It also enables us to learn something about criminal trials from people who are constantly engaged in the work. To this extent it is a sort of laboratory where legal procedure may be examined and reported upon for the benefit of the community as well as the accused.

OFFICE OF PUBLIC DEFENDER

One further step in progress may be noted. It is likely that in time many more states in fairness to the accused, and because they want to know more about the so-called crime waves, will establish the office of Public Defender, or Voluntary Defender. It is to be hoped that such an office will be kept out of politics.

Other steps forward cannot confidently be predicted at present. It must not be assumed that the matter is solved for all time. Criminal procedure will probably undergo vast changes in the future. The defense of the accused must keep pace with such changes. It would appear that the practical rule to follow is to see

[31] See Report of New York Legal Aid Society, 1919, to date. See also "The Voluntary Defender in Criminal Cases," *The Annals*, American Academy of Political and Social Science, Vol. CXXIV, March, 1926, p. 74.

As to the Chicago Bureau see *Annals* of the James Nelson and Anna Louise Raymond Foundation for the Support of a Legal Clinic for the Poor, Bulletin No. 2, Northwestern University School of Law, Chicago. Note the use of law students.

A voluntary organization has recently been established in St. Louis.

that at all times the accused receives a fair trial. Then we need anticipate no more martyrs who are monuments to insufficient legal machinery. The defender organization is an advance toward that continual approximation to justice which is all we mortals may expect to attain.

Insanity and the Law

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IN the law of contracts it is only necessary in order to make a valid bargain that a person have sufficient reason to understand the nature and effect of his act. He need not have average mental capacity. Mere weakness of mind or even defect bordering on imbecility is not in itself necessarily sufficient to make an agreement voidable.

In the law of wills testamentary disposition of property can be effected by one mentally unsound if at the moment of making his last will he has what in law is considered a sound disposing mind, in that he is able to comprehend and appreciate without prompting the kind and extent of his property, the disposition to be made of it by the testament, the persons who are the natural objects of his bounty and affection and the significance and effect of his testamentary act.

In cases of torts where a person inflicts a civil injury and damage upon another through a legally wrongful act, not amounting to a criminal act insanity is no excuse in law. Insane persons are held responsible for damages resulting from their tortious actions.

In criminal law insanity is a disease or defect of the mind which renders an individual incapable of entertaining a criminal intent. In this paper consideration will be limited to insanity as it relates to the criminal law.

In medicine insanity is a disease or a disorder of the mind which definitely affects a person's mental processes, thoughts, ideas, judgment and behavior, rendering him incapable of properly looking after himself and his interests and making him a menace to himself and to the community, in such measure as to justify a physician in committing him to an indefinite stay in a mental hospital. Insanity as a disease syndrome must be studied from every angle. Personal, medical, family, social, school and occupational histories, the condition of the physical machine, the symptoms, the pathological conditions and the reactions of the individual to the underlying disease and to his environment must be carefully scrutinized and weighed. Like tuberculosis or toxicology, it is a problem for the medical mind, trained to consider numerous facts, large groups of interdependent factors and the probabilities in each case in the light of past experience.

Insanity can be understood only by an intensive and persistent study of the insane individual himself. Careful and exhaustive study of medical books alone will not give one a real understanding of insanity. Law books and treatises, decisions and opinions as to what insanity is or should be will not shed substantial light upon the real nature of the condition.

Disease and poisons affect the intricate brain functions. The tune produced by alcohol, opium, cocaine or any other chemical agent introduced from without, playing on the strings of this

delicate instrument, may be one of harmony or discord, depending upon the physical damage done to the brain tissue and also upon the multitude of residual impressions implanted in the cells by instincts, shocks, pains and memories long since passed out of the field of consciousness. The mental picture in any condition, whether it be a mild conduct disorder, a threshold mental state or a fully developed psychosis, will depend upon the type of germ or toxic substance which gives rise to the abnormal mental and physical phenomena and upon the type of cells and brain which the injurious agent has found ready for its troublemaking activities. With normal healthy cells the thought reactions are usually within the normal limits; with decadent or diseased cells the reactions will vary with the type of disease.

INSANITY AS INTERPRETED BY LAW

The law has recognized the fundamental general principle that a man who is so mentally diseased as to be morally irresponsible should not be held legally responsible and accountable. The profoundly mentally disturbed, the raving maniac and the "driveling idiot," those bereft of all reason and choice, do not pay the penalty of the law for their transgressions.

The state has the right and duty to take every reasonable measure and precaution for its own protection and for the safety, health and morals of its people. In the criminal law the representatives of the people have prescribed what men may do and may not do, based in the final analysis upon society's conception of the general moral standards which all should observe. These standards are more or less empirical, based upon the general knowledge and experience as to what is to be expected of a man in ordinary civil life and upon what is conceived to be for the best interests of the people as a whole. The criminal law, both common and statutory, is therefore framed with reference to the ordinary or average man. He is presumed to have the capability of living up to the minimal standards of good conduct acceptable to society. The law, in taking this stand, therefore accepts the popular and general belief in human freedom and free will, the power to choose, to decide freely between the different courses of action open to one. Man is recognized as a purposive, deliberative, reasoning and free being. He is expected to use his will power and reason to act in a manner acceptable to society. When he falls short of the prescribed standard by violating the law he is *prima facie* held to do so voluntarily and by intent. He must expect to suffer the legal consequences of his act, if apprehended and convicted of the crime. If he can show that for some reason or other, such as real mental disease, he did not have the necessary intent, that he was lacking in the power to exercise his free will and choice, he will be excused. The law, in a word, recognizes that certain degrees and qualities of mental disturbance or disease do influence the capacity of an individual to act in obedience to its precepts. If the diseased condition meets certain legal tests, it is sufficient to secure for the individual absolution from criminal responsibility and the legal penalty.

What amount and type of mental disease and what degree of impairment of the power to choose will excuse a man? What are the criteria? This is a purely legal question. The law, in its tendency toward simplification and certainty, has laid down some general principles and tests to apply to all cases. In its effort to evolve a few logical, certain and simple principles by which to decide these intricate problems the

law has, however, gone too far. The so-called tests, evolved ostensibly to determine the issue of insanity, really are devised to decide in the final analysis whether the person is or is not in the class of mentally ill excused by law from the usual penalty. They serve to determine whether the criminal intent requisite to constitute a particular crime is present.

MENTAL TESTS

The "right and wrong test," laid down in the M'Naghten case, makes lack of knowledge of right and wrong a sole criterion of mental unsoundness. As a matter of fact, such knowledge is not an important factor in deciding a question of mental illness. The test does not, therefore, really decide the issue of insanity. Many people whom medical men would never dare to diagnose insane or certify as such have pretty vague conceptions of right or wrong. On the other hand, any number of the obviously and unquestionably mentally ill and insane have a keen perception of right and wrong; in fact, frequently a perception more keen and more puritanical than that of the average run of normal people. This test, as do most of the tests, seizes upon a particular mental symptom or faculty and makes it the determining symptom upon which to decide the health or illness of the whole mind.

The conception that mental disorder affects only certain faculties, leaving others intact and unaffected, has no foundation in fact. In practice the human mind cannot be dissected into its elements and one faculty considered by its naked self in a closed compartment, as it were, irrespective of its close relationship to the remainder of the mind. Psychiatry looks upon the mind as a unified whole, an indivisible entity. No single legal test or psychological test or reaction can ever constitute a reliable or practical exclusive criterion of the presence or degree of sanity or insanity. Where functions and faculties are so closely interrelated and interdependent as in the mind, tests which take into consideration only one portion of the mind do not furnish reliable information.

The law takes cognizance of a so-called "partial insanity," in which the individual is described as being subject to insane delusions as to certain existing facts but not in other respects insane. In such case the defendant is considered in the same position as to legal responsibility as if the facts to which the delusion related were real. This test conceives a delusion as being insulated from the rest of the mind. As a matter of fact, one of the outstanding characteristics of a delusion as a symptom of mental disease is that it is not susceptible to reason on the part of the afflicted individual. It colors the person's whole mind, his judgment, ideas, actions and conception of right and wrong. A partial or simple delusional insanity is ofttimes more dangerous and deranging than a complete and general loss of all the faculties. This is particularly true of paranoia, the disease of many murderers. No one can tell how far the simplest delusional state will alter the will, the understanding and the judgment of an individual when applied to a specific instance intimately affecting his welfare. The insane delusion test is not practical, just or certain.

The law has not kept abreast of the times in matters of medicine and insanity. It has not accordingly enjoyed the benefit of tried and proven scientific facts. The law moves slowly and must of necessity do so in order to insure certainty and correctness. However, the principles, premises and presumptions regarding insanity upon which these legal tests are based are not

only out-of-date but also for the most part erroneous. During the ten or more decades during which medicine and its basic sciences, biology, bacteriology, chemistry, physics and psychology, were progressing and changing the picture and interpretation of insanity, the law failed to keep abreast of this change of point of view. Legal procedure, insistence upon deciding the issue of insanity as a matter of logic by reasoning from simple principles and premises, the doctrine of *stare decisis* and precedent have been obstacles to the correct interpretation of the mental states of those in conflict with the law.

The law unaided, or aided as it is simply by the opinion of experts in court, bound and limited by rules of evidence, is not competent to decide matters of insanity. Logical principles and hard and fast tests, decisions and opinions do not accomplish the task. Moods, notions, prejudices and sympathies should not enter into consideration. A method which treats each and all alike, which does not permit careful consideration and study of the history, personality and physical condition of the delinquent, the environment and of the situation in which the crime precipitated, which fails to individualize the problem, and which conceives insanity to be purely and solely a matter of psychology and mental mechanisms is unsound.

Single deviations from normal psychological behavior should not be an excuse for a crime. A man should not be relieved from responsibility nor should the penalty be mitigated on the basis of an emotional and intellectual conflict or of an inferiority complex leading to a king-slave situation, unless at the bottom of it all there is a true insanity in the medical sense as conceived by the general run of psychiatrists. Was there ever a conspiracy to commit a crime where one mind did not dominate the situation? Could one easily conceive of a criminal who had no disproportion between his intelligence and his emotional life? Conduct disorders, not as yet accepted by the leaders of the profession in general as constituting or equivalent to medical insanity, should not excuse. Were simple conduct disorders and psychological deviations, new and untried views and theories, to be incorporated in the criminal law, as were the decisions of Coke and Littleton and Hale, the gates would be opened wide to criminals to escape on latitudinous pleas from nearly all crime. If the courts permit untested theories of conduct disorder to be presented as a defense for crime, irrespective of a clear-cut insanity, a state of confusion will ensue which will be much worse than conditions under the present restricted attitude in most of the states. It is far preferable to adhere to the present tests as laid down in the M'Naghten case than to open the doors wide to all sorts of new-fangled theories of conduct disorder and behavioristic psychology. Juries should not be encouraged to acquit all persons who show but a slight psychological, psychotic or mental taint. Serious crimes are probably not committed by normal men, but these men often are not so abnormal as to be considered insane. By the same token they are not so abnormal as not to deserve and need corrective punishment.

FACTS CONSIDERED BY LAW

An individual should not be held morally or legally responsible for his criminal acts from the moment he becomes insane in the medical sense. Was the defendant insane in the medical sense at the time of the commission of the criminal act? Would two or three conservative and experienced psychiatrists, on the basis of independ-

ent careful examinations of the defendant at the time of the act, and irrespective of the act, have diagnosed the defendant medically insane at the time? Would they have been willing to sign their names to legal papers at that time, committing the defendant to a mental hospital indefinitely, even for the remainder of life, for his own good and for the good of the community? These should be the criteria and tests of legal responsibility for crime. This standard is certain, definite and sufficiently specific and elastic to meet all needs, to keep pace with the advance of science and to get at the real facts regarding a mental condition in the most effective and practical manner.

Medical insanity is today, as a matter of fact, the real test and deciding factor in most cases where insanity is pleaded as a defense. The average jury appreciates that the common legal tests of insanity are inflexible and in a great many instances unfair. Accordingly, in the average case where there is sufficient evidence to show presumptive medical insanity, the jury will acquit the criminal, notwithstanding that he may have known the quality and nature of his act and may have known it to be wrong. The jury does not in practice maintain the distinction between legal responsibility and moral responsibility. If the jurymen believe a man to be insane, tests, decisions, the arguments of council and the charge and instructions of the judge are likely to be thrown to the wind and disregarded and the man absolved. It would be much more sensible, therefore, to take the point of view that true and frank medical insanity is a defense for crime.

No two individuals are alike; no two cases of mental illness are alike; no two cases of delinquency or crime are exactly alike. Not all mentally disordered persons are completely irresponsible for their acts. The law should recognize a doctrine of diminished or partial responsibility. In the epileptic group we are sadly in need of this doctrine in place of the hard and fast rule of complete responsibility or complete irresponsibility. In Pennsylvania epilepsy is not admissible in evidence as a defense in murder, unless the evidence indicates that legal insanity exists. An epileptic may not be insane and yet he may lack that control which normal individuals show in violent temper. Under irritation he may have so little control of himself as to become a dangerous, potentially homicidal type. Epilepsy affects the mind and its balance. It leads not only to morbid and uncontrolled impulses but also to fits of violent and uncontrolled irascibility and temporary conduct disorder. Yet the epileptic may be able to appreciate full well the nature, significance and moral quality of the wrongful act. While repeated epileptic attacks and the resulting mental deterioration may not be of such grade as to warrant the confinement of an individual in a mental hospital, yet in the event of the commission of a crime it should be considered as a factor serving to diminish responsibility and mitigate the penalty.

Treatment of Insanity by Law

This problem of insanity and the criminal law which has so long vexed the law and medicine should be treated scientifically. Thirty years of experience with this problem has convinced the senior author of this paper (Dr. McCarthy) that the best method of attacking the problem is to vest in the court the power to commit and transfer to an institution for the care of the mentally ill all prisoners who plead insanity as a defense and to appoint a commission of three experts, experienced in mental medicine, to deter-

mine the defendant's mental condition. State mental hospitals as public institutions are especially able and well equipped to serve as the laboratory in which the human problem can be studied under the constant observation of the physicians of the institution. The usual psychiatric examinations in the approved medical manner can be carried out. The experts can observe and study the individual's conduct and behavior over a period of three or four months or as long as is necessary. The commission should submit a written report to the court, stating whether the defendant was sane or insane at the time of examination and also including an opinion as to his mental condition at the time of the commission of the crime. The report should be full and detailed, containing a detailed description of the defendant's behavior and symptoms, the results of laboratory tests and reasons upon which the conclusions are based. This report should be read to the court and jury at the trial and should be admissible as evidence. A minority report might also be prepared if the experts cannot agree. The neutral and unbiased experts of reputation, having the confidence of their profession and of the public, should be permitted to testify on their report and their findings and also upon the reasons for their opinion. The experts should, of course, be open to cross-examination by counsel for both parties in the case. The medical expert should not be required to give an iron-clad definition of insanity. It should only be necessary that he be honestly convinced that the individual is insane according to current medical standards and therefore committable under the law to a mental hospital.

A report, embodying the complete results of an exhaustive study of the case by physicians, whose neutrality and impartiality are beyond question, will carry a tremendous weight with judge, counsel and jury. It will place in their hands clear, definite and reliable information as to the real condition of the defendant's mind. This is a time-saving, economical, efficient and humane method. It is far preferable to the present method of listening to the broad opinions of experts and near experts who, after one or two casual examinations, give conflicting opinions in a court of law, hampered by frequent interruptions by counsel and limited by the scope of their investigations, by the rules of evidence and by the method of question and answer. Finally, the estimate of the accused's mental make-up and its relation to behavior, such as a psychiatrist gains from a private, scientific examination of the defendant, is decidedly more accurate and true than that which a commission might gain from hearing witnesses testify under oath in open court in answer to questions put by counsel.

The question of responsibility is left entirely to the court and jury. If the defendant is found insane this should be sufficient to excuse the individual from the penalty for the crime. On the other hand, the logical sequences to this would be that an individual who was so dangerous to the community as to commit a murder, even on the basis of mental disorder, should be confined for a minimum period of from three to five years, or until such time as he shall have recovered, to a mental hospital for treatment, instead of being let go scot free as happens so frequently today.

Such a system would have a tendency to educate judges, lawyers and juries to a real conception of insanity. Such procedure would also have its effect upon the prosecuting attorney. Instead of having experts of his own choice answer two or three simple questions on the basis of the M'Naghten case,

he would have impartial experts appointed by the court to review the case in an unbiased way as they would an ordinary case in private practice in consultation with other physicians. He would have in his hands a report which carries weight with the jury and which also has the added effect of placating the public mind in its attitude towards both the legal and medical professions in contentious cases.

The zeal of the usual district attorney to present a strong case in a prominent trial leads him, as it also does the attorney for the defense, to the selection of experts who are found by interview to hold an opinion favorable to his side of the case. Experts retained by opposing sides will naturally be swayed in their opinions, to some extent at least, by considerations of counsel and retaining client. In this manner bias is injected into the proceedings from the very beginning. This need not and should not be so. The court and the public can and should force the issue. Attorneys and medical experts should not be permitted to lower the respect and the confidence of the public in the legal and medical professions by long drawn out bickerings and battles of wits concerning the mental condition of the prisoner in a prominent or sensational trial. The issue can and should in most cases be settled, with the approval of the court, by conference and agreement of opposing counsel after examination and consultation with physicians engaged by both sides. This failing, the report of a commission appointed by the court, as outlined above, will probably settle the issue to the satisfaction of all concerned. As a final resort, the usual and old method of threshing out the matter in open court remains. This would, however, be the exception rather than the rule.

The Medical Expert Essential

There is room in criminal procedure for a physician to act as a medical friend of the court. His function would be to interpret to the court and jury the written report of the physicians who had the defendant under observation. He would explain to the court and jury the significance of the laboratory findings, symptoms and behavior found in the defendant. He would describe in detail the types of insanity and conduct disorders relevant to the case. He would outline the effects such types of insanity and behavior disorder might be expected to have upon the mind and responsibility of a person. In the Rosier case (*Com.* v. *Rosier*, 2 Pa, D & C 319) various possibilities, such as puerperal insanity, epileptic equivalent, hysteria, pathological jealousy and ordinary jealousy had to be considered. Under such circumstances a description and explanation of the conditions involved and the effect of each upon behavior under different circumstances is a real and proper help to the jury in enabling it to arrive at a proper and just decision. The unbiased consultant or expert friend of the court would be concerned purely with a scientific interpretation of the conditions involved, in terms understandable by the court and by the jury.

The Extension of Probation in Criminal Courts

By Charles L. Chute

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IT is still necessary in discussing probation to define it, to say what it is and is not, it is also important to distinguish between the ideals of probation and their imperfect realization. Probation should always be distinguished from parole, from pardon, from discharge without punishment and from any form of suspended or deferred sentence. It is *sui generis*, a plan of social treatment and discipline applied by the court to such convicted offenders as the court after investigation believes may thus be adequately dealt with and prevented from further delinquency. The probation treatment consists of, first, investigation for understanding of the factors in the individual case; second, a plan of supervision and friendly personal guidance designed to insure successful conduct. It requires competent probation officers employed by the court.

The term parole should be used for conditional release from an institution and supervision thereafter, although it is sometimes used for the act of a court in releasing offenders on suspended or deferred sentence. Probation may follow or be superimposed upon these conditional court releases, but the important fact to be established is that probation, properly conceived and executed, means actually "proving" as the name implies; it is not parole—taking the delinquent's word or promise—it is or should be actual treatment over a long enough period, as a rule for a year or more, treatment which is felt by the offender to be discipline, punishment if you will and if necessary, treatment so intensive and skillfully applied that it rehabilitates the delinquent if that be possible, or else always returns him for commitment.

This is the ideal of probation, but of course, due to its misunderstanding, its newness and lack of support, it frequently comes short of its ideal. It may even be used as an instrument of evil as can any other grant of power. Few persons who think can doubt the advantages of a system which makes possible places individual social understanding and discrimination in the judgments of the court, which affords youthful and early offenders an opportunity to go straight under constructive personal guidance, protecting alike the offender and society; but there are some who, judging from present-day manifestations usually covering a limited field, condemn the entire system as dangerous and unworkable.

Origin and Early Development

Probation as an official system of treating convicted offenders in the courts this year attains its fiftieth birthday. It was in 1878 that the first probation law in the world authorized the criminal courts of the city of Boston to place on probation for crime, in lieu of other punishment, and provided a new court official, the probation officer, to investigate the records, character and social environments of offenders, to advise the court, and to carry out the terms of probation treatment. This law, however, did not spring full-armed from the Jovian head of Massachusetts. In other states, and earlier in England, modifi-

cations of procedure especially with respect to children were taking place in the criminal courts, looking toward the exercise of discretion to modify or remit penalties in individual cases in the interest of individual justice and through the introduction of agents trained not in law but, more important for effective crime treatment and care, in the science and practice of social adjustment. In fact the power of courts to suspend sentence, upon which the probation system was based, had long been established in the English common law as a necessary right of the crown and the state to offset the rigors of an over-rigid and severe penal law. Probation grew originally and has since developed because of the need to limit and enforce the conditions of suspended sentence as well as through the social, humanitarian urge to consider the individual factors, to make the punishment fit the criminal instead of the crime, and to give guidance and help to the offender to promote his rehabilitation.

That social agents were already participating officially in criminal procedure before the first probation law is shown by the Massachusetts law of 1869 requiring that an agent of the State Board of Charity be notified of every criminal action against a child under 16 and that he be given an opportunity to investigate and make recommendations to the court. The same principle is seen in the Michigan law of 1875 which authorized the appointment by the Governor in each county of an agent of the State Board of Charities and Corrections to have charge of boys under 16 and girls under 17 "paroled by the courts"; also by the laws in New York State giving agents of the Society for the Prevention of Cruelty to Children power to take charge of children in court and after conviction, in lieu of fine or imprisonment. These laws were the forerunners of our present juvenile court legislation, but the principles of supervision instead of other punishment and the participation of a social worker in the court processes were incorporated in the early probation laws and applied to adults as well as children.

SUBSEQUENT EXTENSION; LEGISLATIVE STATUS

The earlier probation laws, namely: Massachusetts, 1878 (state-wide in 1880), Maryland, 1894, Vermont, 1898, Rhode Island, 1899, New Jersey, 1900, and New York, 1901, applied to adults as well as children, and most of them followed the first Massachusetts law of 1878 in giving full discretion to the court to place on probation on the basis of individual investigation without regard to the degree of the offence. However, in 1899 Minnesota enacted a probation law limited at first to minors, and in the same year Illinois enacted the first juvenile court law, with probation limited to children. Other states, especially in the West, which followed Illinois' lead limited probation at first to children. Subsequently most of them adopted adult probation laws, sometimes limiting their application. Except in the northeastern states which followed the impetus from Massachusetts, adult probation developed later and much more slowly than juvenile. In 1910 only 20 states had adult probation laws. At present, according to an analysis recently made by the National Probation Association, 33 states and the District of Columbia have adult probation laws and 15 states are without such laws. The latter are chiefly the smaller, more backward states. Ten of the 15 are in the South. All of the 15 states having no adult probation system authorize by law the suspension

of sentence for most offences, under which in some cases the courts develop a type of supervision, as was done in other states before there were any probation laws.

Sometimes it is difficult to decide whether a state has a probation law or not, there are so many varieties and gradations. Take the State of Iowa as an example. The law provides that the criminal courts may parole convicted offenders on a suspended sentence, except for certain serious offences and second offences, and may appoint a probation officer, so-called, who is only a volunteer sponsor in each case. This is a very incomplete probation law, and since no salaried probation officers are appointed under it for the courts handling adults, Iowa has no real adult probation system. But, technically, it is included among the states having an adult probation law.

Analysis shows that many of the 34 states (including the District of Columbia) having probation laws, limit its use extensively. Three states allow only courts of record to use it and one the circuit courts only; one only the courts having jurisdiction of children. Three states permit felons to be placed on probation only under the age of 21. Two states permit adult probation for only a few lesser offences, and two others for misdemeanors only. Eighteen states and the District of Columbia forbid probation for a specified list of the more serious offences; 12 states forbid probation for second convictions of felonies or to persons previously convicted of felony. On the other hand, three states (Maine, Delaware and Arizona) permit probation for every offence, except those punishable by death or life imprisonment, and six states have no limitation whatever. Among these are four of the pioneer states (Massachusetts, Maryland, Vermont and New Jersey) together with Virginia and Utah.

Coming to the very important matter of provisions in the law for appointing probation officers, it is found that the number of probation officers that may be appointed is limited, sometimes drastically, in 15 states and the District of Columbia. In three of these only juvenile court probation officers may be appointed; in four volunteers only. On the other hand, the number of probation officers is left to the discretion of the courts, with limitations in some of them, in 13 states.

In only seven states and the District of Columbia the probation officers' salaries are fixed by law. In most states the public fiscal authorities determine salaries, but the judges in several may fix salaries within prescribed limits and some of the courts in three states have entire power to fix salaries. In 11 states there is now some state supervision or control of adult probation work.

Probation, legislatively, has developed in less than 30 years, outside Massachusetts, without direction or standards, unevenly and incompletely, but nevertheless it has developed each successive legislative year, until today two-thirds of the states have adult probation laws; they have accepted the system, but more than half of them have narrowly prescribed its application or curtailed its administration by arbitrary limitations not contemplated by the founders of the system, or by not allowing the appointment of a sufficient number of probation officers or by both. Generally speaking, the states that have secured the most complete administration of probation, namely: Massachusetts, New York, Connecticut, Vermont, Rhode Island, New Jersey, Michigan, Pennsylvania and California, have least restricted the courts in its use.

ADMINISTRATIVE STATUS

Coming, then, to developments that have occurred under these frequently limited, inadequate and un-uniform laws in our states, development has been slow. The crime-wave agitation of the past few years reveals why, together with what Raymond Moley alliteratively calls the prevailing politics and parsimony of our public administration. Of course, the crime-wave agitation is not new, neither the crime nor the agitation, but its recurrence in the few years past reveals the instinctive and unthinking public attitude which still prevails toward adult offenders (toward children it has largely gone)—an attitude of fear, intolerance of those who have done us an injury and prevailing retaliation, all of which masquerades under the guise of "protecting the public" and punishment for deterrence which somehow never seems to deter.

These forces and the complete lack of state and national aid, until recently in all but six states—allowing the system to grow or not to grow according to whether some humane judge, or not infrequently, some social work organization, campaigned and secured the appointment of an officer or two under the law, have resulted in the administration of probation being even more uneven and incomplete than the law.

Only 19 states really have adult probation officers. I exclude states like Nebraska, with an adult probation law but at last accounts only one half-time woman officer and one man whose salary is limited by law to $1200.

In most of these 19 states adult probation systems are developed only in large city courts, varying in efficiency according to the personnel and appropriations secured. In the three states having probation officers appointed and paid by the state, namely, Rhode Island, Vermont, and Wisconsin, there is state-wide adult probation service, but in so large a state as Wisconsin, with a small state staff, this is not and we believe, can never be adequate. Only Massachusetts, New York, Michigan, Illinois, New Jersey and Pennsylvania together with Rhode Island and Vermont with their state officers, may be said to have demonstrated state-wide adult probation.

Complete statistics of the use of probation are lacking even in the states which have developed it most, with two exceptions. New York and Massachusetts through permanent state probation commissions have published yearly reports on the extent and results of the service. These statistics have shown a constant increase in the use of probation and, partly resulting therefrom, a marked decrease in prison population. An increasing number of courts using probation and more and better probation officers have developed in both states, indicating a genuine public approval of the work. In New York State, in the year 1926, 15,157 men and 1799 women were placed on probation. In addition, 7050 children under 16 were so placed, making a total of 24,006 persons cared for on probation during the year. There were 23,154 persons actually on probation at the end of the year, over three-fourths of them adults. Ten years ago the number on probation was approximately one-half that of today. Twenty years ago only about 1000 persons were on probation in the entire state.

The number of salaried probation officers has each year increased, but not in proportion to the increased use of the system. However, full-time officers have been substituted for part-time, and there has been a notable improvement in the training and other qualifications of officers.

In Massachusetts the same progress has been registered except that the extension came earlier, due to the fact that the law has for many years required a paid probation officer in every court. Approximately 25 per cent of all convictions have been placed on probation each year in Massachusetts, a greater number in the aggregate than in New York, although the population of the latter state is twice as great.

Because of criticism of probation, some of it merited, some a reactionary product of crime-wave agitation, a lessened rate of increase in the extension of probation work has manifested itself in the last two or three years. Still, I believe, that in all states where the laws make it possible, there has been a continuous increase in its use and, what is more important, a general improvement in personnel and methods. For the country the number of salaried probation officers has increased from 2658 in 1922 to over 4000 at the present time. This indicates not only an increasing use of probation but a substitution of paid officers for volunteer work, which is much to be desired.

The extension and improvement of adult probation advances in all states against great handicaps. There is the conservatism of the legal and criminal court systems to which it is attached, an insistence upon a "ritual of punishment," a system of uniform severity instead of that "individualization of justice" which Dean Roscoe Pound says is the greatest need in criminal justice today. There is the reactionary opposition to utilizing social and scientific aids, to social and medical diagnoses which, rightly applied, can contribute so much to the understanding and cure of criminals.

False economy has handicapped probation extension. Because a good probation system involves an initial expenditure, requiring adequate salaries to obtain the high-grade men and women needed for the work, it is considered an extravagance; whereas there is abundant proof that it is an investment that pays large dividends not only in saving men for good citizenship but also in dollars and cents. It avoids unnecessary commitment and all the long continued costs of any system that deals with criminals without reforming them. In spite of the proven economy of good probation administration, the false economy of inadequate probation staffs is still the rule rather that the exception. We not only find the wrong kind of officers, but almost everywhere, an inadequate number. Probation officers are commonly overloaded with from 100 to 500 cases, an impossible number to watch and guide adequately.

The building up of probation departments has been and still is involved in politics. No handicap has been and still is more serious. Nowhere should merit, meaning training, experience and above all the character and personality fit to guide and help all sorts of people, in short a genuine vocational aptitude, more strictly govern appointments.

We are not at sea in this matter. The kind of men and women wanted is well known; such men and women are available, not at the miserable salaries still offered today in many courts, but at lower salaries than such men and women can command in work that appeals less to altruism and desire for service. Nor are we adrift on the way to obtain such officers. It has been fully demonstrated that through the competitive examination, either under an official civil service system, or conducted by another competent, disinterested agency, such as a state board or bureau, or a representative

committee appointed by the court, proper selection of officers can be made. The National Probation Association which has had long experience in assisting in practical examinations for state and national civil service commissions is ready to assist any court or community in conducting such an examination.

RESULTS OF PROBATION

In spite of the faults and inadequacies that have been mentioned we can say negatively that probation has escaped the prevailing criticisms as to its results that have been heaped upon other methods of dealing with offenders, notably upon parole and prisons. We do not yet have adequate statistics of its results nor a sufficient number of after-studies of probation treatment to dogmatize about them, but we do know that for the probation period at least, society is relatively safe and a larger number of probationers complete probation treatment successfully than any other form of treatment can show. In 1926, in New York State, only 6 per cent of all probationers escaped from supervision (not many more than escape from penal institutions), while 11 per cent were returned to court as failures and were committed. Eighty-three per cent finished their probation terms without further offending and were discharged. Massachusetts has shown for many years about 80 per cent successes on probation. Studies that have been made of the results of probation for a period of from three to seven years after discharge, although inadequate as yet, have indicated that about 70 per cent of adults go straight and do not get into trouble again. When probation work generally becomes more adequately manned, when the system of preliminary investigation by the probation officer before probation becomes universal, and as a result probationers are more carefully selected and supervised, a higher percentage of success may be expected.

NEEDS AND POSSIBILITIES

Probation as highly individualized treatment, based on social understanding, in its methods constructive and positive, instead of destructive and negative is in line not only with humane principles but also with scientific knowledge, now in process of discovery, as to how best to guide and influence human beings. The needs of the system today have been referred to throughout this paper: adequate laws, not restricting the court in selecting probationers upon the basis of character and needs rather than the offence; provisions making possible an adequate staff, adequately compensated, in each court; selecting probation officers on merit only; establishing the system of prior investigation bringing more careful selection of probationers; efficient supervision based on individual study: these are the primary needs today. To them may be added continued education of the courts and the public through the development in each state of an efficient state bureau or commission to extend and regulate the service, and the continued work of voluntary organizations, state and national on behalf of better administration.

The possibilities of extension we cannot yet see. Probation work has already taken its place as one of the major aids to efficient justice and reformation, bringing in preventive treatment of delinquency. The future is assured if those who administer the service are faithful to the trust and measure up to the opportunity that lies before them.

Executive Clemency

By Edward G. Griffin
Counsel to the Governor of New York

THE use of the pardoning power by the governor of a state is constantly subject to severe criticism from many sources. Some people fear that the executive is setting loose in the community a horde of murderers and lawless individuals who should still be retained within prison walls. The unreasoning critic often accuses the authorities of playing politics, or of being completely taken in by heart-rending stories of relatives or friends of the prisoner so that all judgment is lost and in an emotional outburst the prison doors are flung wide open. The effect of such ideas on the community, no matter how few are the persons who entertain them, is so serious that the facts should be put before the public.

An example of the more thoughtful sort of criticism is contained in the report of the so-called Baumes Committee in New York State.[1] It makes the following statements, among others, giving figures for the year 1925:

> During the year ending October 31 last, there were ninety-two pardons, seventy-nine commutations, two hundred and two restorations to citizenship and thirteen respites in capital cases granted by the governor of this state. This is the largest number of pardons granted in over forty years; the largest number of commutations in thirty years except for the years 1927 and 1920, both inclusive; and the largest number of restorations to citizenship in a like period except for the year 1920.
>
> A mere statement of these figures in times like we are now experiencing, forces inevitable mental deductions and conclusions.
>
> It is extremely easy through the relaxing of rigid scrutiny of the merits of individual applications for executive clemency and the giving of freer rein to sentimentalism, to so hearten the criminal classes as to create in them a feeling of security that an avenue of escape from the service of prison terms exists, no matter what the sentence of the court nor the enormity of the offense. . . .

The foregoing is a fair statement of the attitude of the committee making the report. It calls for an explanation.

Under the law of our state, pardons and commutations of sentence are registered in the office of the Secretary of State and consequently the figures are available for properly authorized persons. The Baumes Committee in examining the records of this office found between 200 and 300 pardons issued in one year.

Based on this fact alone the committee report indicated clearly that leniency to criminals on the part of the Governor was encouraging crime. It was an attempt to induce people to believe that pardons were dealt out from the Executive Chamber as a matter of political influence. This is not the case.

While the figures for pardons granted are in the office of the Secretary of State, the facts on which the pardons were issued are in the Governor's office. The committee did not go there for its information. Yet without the underlying facts the figures are misleading.

Reasons for Pardons

The constitution of New York State authorizes the Governor to use the pardoning power. A governor who is

[1] Report of the Joint Legislative Committee on the Coördination of Civil and Criminal Practice Acts; Legislative Document (1926) No. 84, at page 27.

doing his duty will find frequent cases where the exercise of this duty is not only desirable but actually necessary. There were many cases of this sort among those listed by the Baumes Committee.

Perhaps the facts show up as clearly as anywhere in the "Statement of the Pardons Commutations and Reprieves Granted by the Governor for the Year 1926," State of New York Legislative Document (1927) No. 73.

In this report is indicated that executive clemency was exercised in the cases of 84 persons during the year 1926.

Foremost among the reasons for granting a pardon is the desire to restore to the former prisoner his right to vote. The practice in New York State is to allow him, after he has been out of prison for some time, to petition the Governor for this privilege. It is granted upon evidence that during the period of his release he has been earning an honest living. Of the pardons granted annually a large percentage are issued under entirely justifiable circumstances giving back the right to vote.

A second reason is the desire of the former prisoner, an alien, to complete his citizenship papers and become an American citizen. One of the requirements of the Federal Courts in considering applicants for citizenship is that the applicant shall not be admitted unless and until he has secured a pardon from the Governor for any crimes of which he may have been convicted. It is unreasonable for the Governor to refuse a pardon under such circumstances. Perhaps in 50 per cent of the cases a man thus is given an opportunity to become a citizen by the use of executive clemency. In 1926 the report discloses that of the 84 persons involved 56 were pardoned after completion of sentence to permit naturalization. Five were pardoned after completion of sentence to save them from deportation, and two were aided after completion of sentence to permit their reinstatement in the practice of a profession.

The balance of the cases involve the question of commutation of sentence. There are many reasons why such a commutation is necessary. Among them the most justifiable include the requests of district attorneys who prosecuted the cases. There are instances where the district attorney has promised the convict if he will give information as to the other persons involved in the crime the district attorney will aid in lessening the sentence of the particular prisoner. The district attorney, then, to make good his promise, must ask help from the Governor and the Governor must do something.

Again there are commutations of sentence upon the express recommendation of the judge. It is an invariable rule not to commute a sentence unless both the judge and the district attorney before whom the man was tried agree in writing. This places the responsibility for the pardon upon the parties who know most about the offense, as well as upon those who must decide the immediate request.

Perhaps the crux of the report of the Baumes Committee lies in the fact that ten respites to murderers were given. Here, if anywhere, there is justification for a speedy administration of justice. The public is horrified at any leniency to a person convicted of such a crime. This again is a good example of loose thinking. There are any number of circumstances which may make a postponement of execution necessary. Once the accused is dead there is no opportunity to correct mistakes. It is a solemn responsibility to refuse to delay the death of a human being because

a man fears that he may be criticized for doing what he conscientiously regards as his duty. Such respites in every case are granted only after the written request of the district attorney who tried the case. This official has sufficient reasons for such a request to justify him, and he knows the facts. The important point to note is that in a given year ten respites were given to murderers, and eventually nine of the ten were electrocuted. The tenth criminal did not suffer the death penalty. He was granted a respite on the request of the district attorney, because he agreed to give and did give testimony for the State to aid in the prosecution of others implicated in the same crime. In the year 1926 two persons were thus given respites.

After weeding out the various cases we find that of the persons considered in the course of a year in New York State for the exercise of executive clemency, an average of ten are pardoned outright in the sense that they were released from prison. This is about 4 per cent in any year. In 1926 three men were thus released from prison. But in each case action followed the voluntary recommendations of both judge and district attorney.

In the same year there were fourteen commutations of sentence. Of these there was a commutation from the death sentence to imprisonment for life in five cases. Four persons were placed on parole. Two were released to allow them to return to their native country, one on a deportation warrant. Three were let out because of incurable disease. One was released after having served practically his entire term. One was permitted to return home after he had assisted in preventing a jail delivery and upon the voluntary recommendation of the judge and district attorney.

There are extenuating circumstances even in these cases. Some of the ten are men dying in prison. They are let out to die outside. One man died while he was changing his clothes preparatory to leaving. Others are released either because their health is impaired seriously in prison or because representatives of foreign countries desire to send them home to their own countries, and because of the parole laws in New York their sentence could not be commuted.

Sometimes the newspapers write a story about the Governor, who makes a Christmas present to the criminal by releasing him in time to eat his Christmas dinner with his family. This usually happens when the man is sentenced for a long term, which is about to expire the first part of the following year. There is no real reason to insist that the man complete his term. If he is released a couple of months early on a ten- or fifteen-year sentence no harm and perhaps much good is done.

The orthodox reasons for pardoning the accused are that he has reformed, or that there has been a mistake in his commitment. In either case if he is improperly confined he ought to come out, and no governor can afford to keep such a man behind the bars. It would not rest easily on his conscience. On the other hand, if he should not be released no amount of pressure should make the Governor budge an inch. The determination of which attitude to take, however, depends not upon a set of figures. Because two hundred persons were pardoned last year is no reason why this year pardons should be granted to an equal or less number. If the facts of the individual case warrant it, the man should be pardoned, and under no other circumstances whatever.

RESPONSIBILITY OF GOVERNOR

There are justifiable reasons for the exercise of executive clemency. The procedure in such cases is not a general jail delivery based on an executive whim.

The responsibility of the Governor at the time of considering an application for pardon is as great as that of the court at the time of conviction. The proceedings are not unlike. People can see the court at work and readily understand why the man is convicted. These same people should learn not to generalize about executive clemency, or to draw inferences from insufficient facts as to the way it operates. Only after an examination on the facts is criticism justifiable.

The law of New York State confers upon the Executive the power to grant pardons. With this power goes the duty to see that it is properly exercised. It is equally wrong from a legal as well as a moral sense to refuse to grant a pardon under circumstances where the facts indicate the opposite course should be followed. A governor must make a correct decision in each case. He should have the courage to do what he thinks is right under all the facts of the case. If he does not do so he should not be governor.

Public Defender in the Police Courts

By Ernest R. Orfila
City Public Defender, Los Angeles, Calif.

Of all the departments of a city government, that of the City Prosecuting Attorney touches most closely upon the life of the residents of the city. In times of trouble arising from the increasingly complicated phases of city life, and the new and old contacts that come from a city changing to a metropolis, those affected by the condition call upon the Courts for aid. The Prosecuting Attorney's office, in the city of Los Angeles, California, has issued in the year ending 1927, 215,250 criminal misdemeanor complaints, charging violation of city ordinances and state laws.

The Police Department has, in the year ending December, 1927, arrested 219,021 persons, who were actually arrested and placed in the city jail. This includes persons charged with felonies, state misdemeanors, city ordinance and other miscellaneous detentions. This does not include those actually arrested on traffic complaints, which number about 140,028. Of the number of the other arrests, about 8000 were persons charged with the commission of felonies and about 12,000 were miscellaneous detentions, the balance being ordinary misdemeanors. With these figures at hand, one can readily see that the Police Courts are the busiest of our criminal courts, in practically any metropolitan city. In this city there are seven divisions of our Municipal Court that handle nothing but misdemeanors, such as petty larceny, petty embezzlement, battery, vagrancy, violations of liquor laws, prostitution, disturbing the peace and several others. There is one department or division that handles nothing but liquor violations, three departments handle cases where juries have been demanded and two departments are used for the disposition of all other cases where defendants are arraigned, and if they waive a jury or enter a plea of guilty, their cases are disposed of in that department.

In this article we shall treat only of those persons who are charged with committing misdemeanors other than the usual traffic violations, which ordinarily do not involve any criminal act or intent and are naturally disposed of without the aid of counsel.

Functions of the Public Defender

As City Public Defender, this office is called upon to help persons who have been arrested and lodged in the city jail. Persons charged with felonies and arrested by city police officers are entitled to the services of this office, until they are bound for trial in the Superior Court, at which time they then must consult with the County Public Defender, who represents them in that Court. Those that are arrested for the commission of some offense classed as a felony are generally held in the city jail for forty-eight hours for an investigation before a complaint is filed. This office helps them in any manner possible and communicates with the arresting officers, and, in many cases, when all of the facts surrounding his arrest are established, the defendant is released without any complaint being filed against him. It sometimes happens that the charge is reduced to a misdemeanor and the defendant is

then taken into our Police Courts, where he is represented by the City Public Defender.

This department has, in the Police Courts, actually represented 3273 persons who were charged with commission of various misdemeanors, in the year ending 1927. This number does not include those visited at the city jail, charged with felonies or miscellaneous detentions, and to whom legal advice was given and told what their constitutional rights are while being held a prisoner. It is an established fact that where a prisoner in a Police Court is not represented by a lawyer, he is not given a fair opportunity to present his defense or to present all the circumstances surrounding his arrest, so that the Court might know all of the facts before rendering its decision or imposing a just sentence. This is through no fault of the Court or Prosecuting Attorney, or of the arresting officers. The defendant will in many cases state that he is capable of meeting the issues involved alone, and consequently, through his lack of legal knowledge, very seldom if ever takes advantage of cross-examining those appearing against him or of procuring witnesses in his behalf to establish whatever defense he may have.

Where a defendant is represented by the Public Defender there is bound to be greater accuracy in trying his case, because he is informed in plain words of the offense charged, of all of his constitutional rights, such as, that he is entitled to a trial by court or by jury, appearance of witnesses to testify in his behalf, that he must be confronted by those against him, and is advised whether or not he has a fair and legal defense of the offense charged. He is in a position then to enter a proper plea and, if he proclaims his innocence, he enters a plea of "Not Guilty," the date for his trial is set, whether by court or by jury, and he then has ample time to prepare for his defense and subpoena witnesses to testify for him. Where the Public Defender consults with the accused before he is arraigned in court and has all of the facts from the defendant, and in many cases, also from the arresting officer or complaining witness, if he is then satisfied of the defendant's guilt, he advises his client to enter a plea of "Guilty." The defendant is then ready to receive his sentence and all facts in mitigation of the offense are presented; if he is entitled to any leniency, the Court will, in most every case, sentence him accordingly.

In many of these cases the man is placed on probation or given a suspended sentence. The records of this office show that in the representation of clients, a greater percentage of pleas of "Guilty" are entered than those of "Not Guilty," and of those cases represented by this department, where there has been a conviction, whether by a plea or by trial, 1746 persons were given suspended sentences or placed on probation. Before the Public Defender will proceed with the actual trial of a case, he is satisfied that the defendant has a good defense. This is borne out by the fact that 80 per cent of the cases tried result in acquittals.

The Constitution of the United States provides in the Fifth Amendment:

> No person . . . shall be deprived of life, liberty, or property, without due process of law.

Sixth Amendment—

> In all criminal prosecutions the accused shall enjoy the right to have compulsory process for obtaining witnesses in his favor and to have the assistance of counsel for his defense.

The above notes establish the fundamental right of the accused to be rep-

resented by an attorney—this is based on two propositions imbedded in the structure of Anglo-Saxon legal thought. When a person is brought before a Court of Justice, charged with a criminal offense, if those rights given him by the Constitution have been observed and he is given a full opportunity to present all of the facts constituting his defense, there is more likelihood of this person having a greater respect for our laws and Courts of Justice, for he is then satisfied that no unfair advantage has been taken of his unfortunate position. A person charged with an offense, if he is guilty thereof, expects to be punished by a just sentence, but they rebel against excessive punishment and become hardened against attempts of reformation when punished too severely.

ADVANTAGE OF THE OFFICE

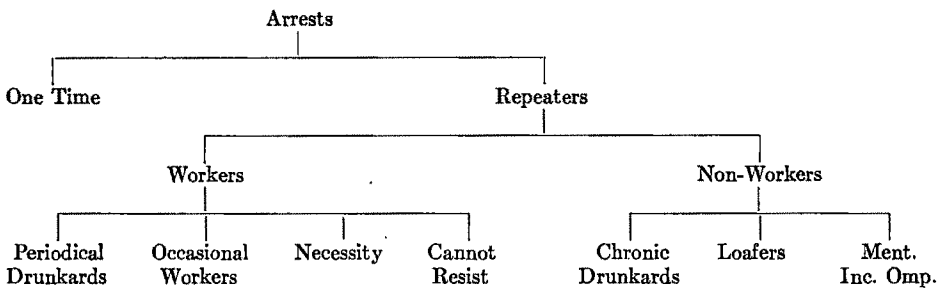
Where defendants are represented by the Public Defender, it is very seldom if ever that the defendant feels that the punishment meted out to him is too severe, for he is told by his counsel in advance, who is generally familiar with what the sentence ordinarily is in a case of his class. If the defendant should be so unfortunate as to be committed to jail, he enters there with a feeling that he is receiving what is due him and not any more, and when he is released after serving his sentence, he naturally has that respect which is due to the community at large, by respecting our laws.

It is an established fact that in the trial of a case, where the defendant is represented by the Public Defender, that the time actually consumed in the trial of the case is very much less than that consumed by a private attorney. This is probably due to the fact that a private criminal lawyer, who is receiving a fee for representing the defense of his client, is not interested in the saving of time or expense to the community. His one purpose is to satisfy his client regardless of whether the defendant is guilty or not guilty or how much time is consumed or what the expense to the city might be. If he has consumed a great portion of time in the trial of a case and, as one might say, made a lot of unnecessary "noise," it is all for the purpose of making an impression on the defendant by making him believe that he is a great criminal lawyer and has earned whatever fee the defendant has paid him, that he as well as his client might be satisfied. This is not, of course, true of all of the legal profession who practise criminal law, but of only a few who generally prey upon Petty Offenders who are being tried in the Police Courts; these are commonly known as "shysters." These "shysters," when they first interview prisoners in the jails, present themselves as having been recommended by some particular friend of the prisoner, make rash promises and guarantee that if they are represented by them they will be acquitted, which to these individuals is welcome news and consequently they gladly part with whatever amount of money they may have.

The Public Defender is in an entirely different situation in that he does not make any promises to the prisoners, except that all of their constitutional rights will be protected and that they will get a fair and just trial. Our experience here has shown that where defendants are represented by these "shyster" lawyers and have been convicted and sentenced, they are generally, while they are serving their sentences, our worst type of prisoner, because they soon discover that they have been misled and that their attorney did not present their defense as it should have been presented, and complain of having been robbed by these "shysters," and consequently become

very much dissatisfied with all of the criminal procedure in our Courts. The Public Defender never takes advantage of any petty technicality in the criminal pleadings or in the trial of a case, as long as they do not affect the constitutional rights of the defendant, because, by doing so, one does not gain any advantage—it only delays the trial of a case, which this office tries to avoid. A private attorney aims, on all occasions, to take advantage of these matters which gain no good purpose, except that, as stated before, it creates an impression in the defendant's mind that he is a good lawyer.

criminals, who commit the higher degree of crime. It has been an effort of this office to try and reform these Petty Offenders, but to do this, it is first necessary to learn the causes, or approximate causes, of these offenders being in jail. To find this out, one must get at the "root of the trouble" by close examination and close contact with the offender. This office, in its effort to reform these Petty Offenders, classifies them into two divisions. The first is *One Time Offenders*, and the second is *Repeaters*. The Repeaters are again classified into Workers and Non-Workers.



WHO ARE THE DEFENDERS' CLIENTS?

If the defendant is a stranger in town and the Court sees fit to release him, either by an acquittal or by a suspended sentence, the Public Defender is in touch with various employment agencies and makes an effort to see that this man receives employment and becomes a useful member of society. This is not true, ordinarily, of the criminal lawyer in Police Courts, who is satisfied to forget the defendant if he has received his fee, regardless of what the future might be for the poor, unfortunate soul, who has been deprived, by this type of attorney, of all of his money.

The class of people ordinarily handled by this department are the ordinary Petty Offenders, who are to be distinguished from the hardened

The One Time Offenders are composed of all classes, and many causes are found for their presence in the jail. We do not look upon them, however, as a serious menace, because we believe time has shown that the majority of One Time Offenders never return, but profit by their one experience and use their own moral force or steam to get back on the right track and remain there.

The Repeaters present a more serious problem, for a man twice or three times in jail easily slips into the habitual class and thereafter forgets the number of his arrests and also forgets to care. These Repeaters, who have not responded to the punishment they have received in the Police Courts, finally commit a higher offense, for which they are eventually committed to State Prison. This fact was borne

out by my visit to State Prison at San Quentin, the early part of the year 1927, when I had occasion to personally see a great many of those whom I had represented when they were charged with some petty offense during my incumbency of this office. The majority of these persons were those who were classed as Repeaters in the Police Courts, upon whom the short sentences meted out to them seemed to have made no impression. In the majority of cases of persons serving time in the state penitentiary, the records disclose that they have had a bad police record of petty offenses, before they finally enter a state prison for the commission of some felony.

Other advantages of the Public Defender in the city jail, are that prisoners cannot be kept incommunicado because the Defender enters the jail, announces himself, and the prisoners have the opportunity to speak to him and ask whatever assistance they may desire.

Prisoners are more humanely treated, because they have a person to whom they can complain, and the Defender has always made it a point to investigate bruises, cuts and other injuries observed on the persons of prisoners. We do not believe that police officers are at heart brutal, but some of them, through long association with the criminal element, become hardened and handle them roughly and carelessly.

The Third Degree has been eliminated because persons arrested have immediate access to the Public Defender and any attempt at Third Degree methods is touched upon at the trial.

Unnecessary delays in going to trial are lessened because the Defender gathers his evidence at once and the prisoner is able to announce himself prepared.

It is impossible for an officer to throw a man into jail and forget him, because the Defender examines the jail records every day and makes a list of all those who have been in the jail forty-eight hours or more, without having been taken into court. This list, with complete data including day and hour of arrest, charge made and name of arresting officer, is delivered to the chief of police each day and he in turn has an officer of rank communicate with each arresting officer and call for a report explaining the delay.

SUMMARY OF RESULTS

In conclusion, will be briefly shown the results of the establishment of this office in the city of Los Angeles, California:

1. The expense to the city in conducting the trial of cases in the Courts has been materially reduced.
2. Every prisoner has had an equal "show" at his trial.
3. No person has been compelled to plead guilty to a charge of which he declared himself innocent, as previously happened when a lack of funds compelled the person to appear without an attorney.
4. No prisoner has been kept in jail incommunicado.
5. The prisoners have been more humanely treated.
6. The Third Degree has been eliminated.
7. Unnecessary delays in going to trial have been ended.
8. The possibility of persons being thrown into jail by officers and forgotten is a thing of the past.
9. "Shysters" have ceased to make the city jail a place to prey upon persons of small means.
10. Every prisoner has a friend to whom he can report and have his rights respected.

Experience in the cities which have established the office of Public Defender has justified its creation and demonstrated that it brings about a better administration of the laws without additional expense and without obstruction of justice, and it can be safely predicted that eventually all of our large cities will provide a proper official to defend the poor who appear before our criminal courts without an attorney.

Training for the Bar

By Alfred Z. Reed
Staff Member in charge of Study of Legal Education, Carnegie Foundation for the Advancement of Teaching

THE term "bar," as applied to the legal profession in this country, is at present somewhat of a misnomer. American lawyers have little in common with English barristers. As regards both the process by which they secure their professional privileges, and their organic relation to the state, they have quite different historical antecedents. They are descendants of the common-law attorneys and the chancery solicitors of England. At the time of the American Revolution these then somewhat discredited practitioners were appointed by their respective courts, under regulations that permitted, and even encouraged, the same person to qualify as both attorney and solicitor. This system of judicially appointed lawyers was, naturally enough, introduced into the colonies, usually in a technically simplified form. That is to say, the original distinction between "attorney" and "solicitor," which even in England survived only as a fiction, was soon forgotten in most American jurisdictions.

The more vital English tradition of an organically distinct "bar" survived much longer in this country, and complicated the organization of our legal profession in two ways. In the first place, prior to the Revolution, young men of good family were frequently sent to qualify as barristers (or "counsellors," as they were then more usually termed) at the historic Inns of Court. And in the second place, both before and after the Revolution, the older jurisdictions attempted to develop their own native barristers or counsellors. In this latter case, however, the difficulty of extemporizing institutions analogous to the venerable Inns of Court combined with the relative scantiness of legal business to prevent a reproduction of the organically and functionally independent English "bar." American legal practitioners have never been divided, like those of the mother country, into two mutually exclusive groups. There was merely a system of promotion, after a certain number of years of practice, into one or more upper ranks or grades, the members of which acquired new professional privileges without surrendering those that they had previously enjoyed. Even these experiments did not (with an exception of little practical importance in New Jersey) survive a general leveling movement that swept away admission standards prior to the Civil War. Everywhere else, "attorneys" became at the same time "counsellors." Finally, instead of being "appointed" to office (as they still technically are in New Jersey), they came to be thought of as "admitted" to legal practice, and hence "members of the bar." General practitioners assumed the name and the functions of an ancient English guild, in the absence of any specialized group having a better claim to the distinction.

Officers of the Court Rather than Members of the Bar

American attorneys differ from those of England not merely in having absorbed the other branch of the legal profession. In the course of a curiously contrasted development, they have retained characteristics that their

English cousins have lost. The powerful English bar did more than preserve its own privileges. It provided a model of professional organization that the other branch in time followed. Judicially appointed attorneys and solicitors gave way to a Law Society in which "solicitors" (as they are now uniformly denominated) determine, subject to statutory restrictions, their own qualifications for admission to practice. A similar development occurred in English-speaking Canada, which in other respects resembles the United States; that is to say, such distinction between "solicitors" and "barristers" as there survives has become as purely formal as the original English distinction between solicitors and attorneys. In our own country, on the other hand, the principle of judicial control over the process of admission to legal practice has nowhere been replaced by the guild principle of self-determination.

Undeniably, judicial control over American lawyers has been weakened. As in England, statutory restrictions upon the process of admission exist, and in many states these limit the power of the admitting authority much more narrowly than does English or Canadian legislation. Moreover, in the great majority of our states the actual administration of admission requirements has been placed in the hands of an examining board, the members of which are almost always, but not invariably, appointed, with classified terms, by the highest court. In two instances (Florida and Mississippi) the governor exercises the power of appointment, and in one of these jurisdictions (Mississippi) the court seems to have lost not only this power, but all control over the process of admission. Actual participation, however, by the organized legal profession itself in the determination of its own membership occurs only in five states that have been influenced by a recent reform movement looking toward the establishment of an inclusive "self-governing bar" (Alabama, California, Idaho, New Mexico, and North Dakota); and in every one of these jurisdictions the court retains some measure of control. If it does not continue to appoint the examining board, or if it does not retain the power of excluding applicants recommended to it by this board, it at least is specifically authorized to disallow such rules or regulations with regard to these matters as the lawyers may adopt.

In a word, whereas English and Canadian lawyers are organized in two branches on the lines of mediaeval guilds or modern trade unions, in the United States they derive their privileges from a superior organ of the state—almost invariably a court of justice. Except for the circumstance that their number is not limited, these "officers of the court" are in effect governmental functionaries. They are part of the unclassified civil service.

DIFFICULT EDUCATIONAL PROBLEM

All this creates a very difficult educational problem. On the one hand, the fact that the practice of the law is not divided like that of the healing arts into independently organized professions or vocations (physicians, dentists, pharmacists, nurses, midwives, veterinaries) makes for a generalized course of preparation which, if it is to be adequate, demands from its students the expenditure of much money and time. On the other hand, the peculiarly public or governmental character of the legal profession renders it undesirable to set up standards of such severity as to make this important division of our governing class unrepresentative of all social groups and economic levels. So long as legal ed-

ucation is thought of as preparation for an undivided public profession, just so long must its standards represent a compromise between these two points of view. Our lawyers today are not so well trained as, in the interest of efficiency, they ought to be. Under our present system of pseudo-uniformity they cannot be made so except through bar admission requirements so exacting as to keep the legal profession from being truly representative.

PROSPECTS FOR DEVELOPMENT OF A GENUINE BAR

Relief from this difficult situation through the development of a separately educated bar, enjoying special professional privileges, may be looked for, if anywhere, from one or all of three sources.

AN INDEPENDENT FEDERAL BAR

(1) Our American system of a federal judiciary, separated from that of the states, contains possibilities of organic differentiation that we have hardly begun to realize. The federal courts have done a very little to relieve Indiana from the predicament in which it has been placed by a peculiar provision of its state constitution, guaranteeing to every virtuous voter the right of admission to practice law. Furthermore, the Supreme Court of the United States demands a few years of practice for admission to its own bar. Even if this already existing machinery were fully utilized, however, it could not, of itself, go farther than to revive the old notion of an upper professional rank or grade, and would probably not do even this. The most likely result would be to stimulate lethargic state courts into bringing their own admission systems into conformity with a federal model. This outcome would be beneficial, so far as it went, but it would not reach the root of the difficulty.

MEMBERSHIP IN A SELECTIVE BAR ASSOCIATION

(2) Already a comprehensive, even though internally disunited, system of bar associations—national, state, and local—divides American lawyers into separate groups—those within and those without these voluntary organizations. As yet, however, this organic division has little real importance in the eyes either of the legal profession itself or of the public at large. There is no corresponding division of functions, of professional privileges and responsibilities. Furthermore, although these associations, in addition to being voluntary, are usually selective, the principles in accordance with which they make their selection are rarely clear, and sometimes amount to more in theory than in fact. There is a formal election to membership, but side by side with this are often organized "membership drives," the object of which is to bring every reputable lawyer in. Admission is not restricted to lawyers who have been trained in some special way. These associations are sometimes in the position of not demanding, for admission into their fellowship, even those qualifications that they urge the states to exact in the case of every would-be lawyer.

A DIVERSIFIED SYSTEM OF EDUCATION

(3) A more fundamental cleavage among lawyers is rapidly being effected by differences in their training. Law schools are now universally recognized as the principal factor in legal education. Efforts to improve them are being made both by the American Bar Association and by the more genuinely selective Association of American Law Schools. The immediate outcome of these efforts has been to make law schools more and more unlike. With some blurring of the dividing lines, two

principal groups may now be distinguished—full-time schools that comply with the standards of these two Associations, and evening schools that do not. This difference in educational preparation naturally tends to produce a corresponding functional differentiation among those who pass through the schools. To some extent already—probably even more markedly in future, as these two groups of institutions grow increasingly apart—their graduates play somewhat different parts in the professional and political life of the community.

This differentiation of the product of different types of law schools is not, however, as yet reflected in the bar admission rules of any jurisdiction, nor, as has just been indicated, in the extra-legal organization of lawyers into bar associations. Furthermore, the differentiation is so recent that no school has thus far consciously attempted to adjust its educational scheme either to the special characteristics of its type or to the probable future career of its graduates. We do not find one group of law schools training its students principally in one branch of legal practice, and the other group in another branch. Both groups aspire to cover virtually the same field. This rivalry reacts adversely upon the education provided by either.

The evil is most easily recognizable in the case of evening or other so-called "part-time" schools. Despite the now generally conceded value of these schools as an avenue whereby students of modest means may enter the legal profession, from a strictly educational point of view they operate under a cloud. Their aspiration to do what, because of necessary limitations of time, they cannot do—provide a preparation equal to that which is or might be provided by full-time law schools at their best—makes them inferior, even though indispensable, educational agencies. But furthermore, and for this very reason, full-time law schools also rarely are "at their best." Already carrying a burden that, because of the complexities of American law, is too heavy for any one type of school, they seldom dare to demand from their students even all that they might. Schools that are most sincerely desirous to improve the quality of American lawyers are constantly fearful lest their efforts in this direction may end by making matters worse. If they raise their own standards too far above the relatively low level that, for political reasons, is as high as any state can be expected to go in its bar admission rules, the result may simply be to drive students into other schools that promise equal professional standing at smaller expenditure of time and money.

RESPONSE TO ORGANIZED EFFORTS FOR BETTERMENT

With a profession that is inevitably wedded to legal precedent, it is not surprising that progress in the direction indicated should be slow. Improvement of our existing system of legal education is at bottom a branch of the broader task that confronts the American people—that of making government operate efficiently over an area and a population without parallel in the history of democratic institutions. It must necessarily take some time to effect a proper adjustment between, on the one hand, the ancient profession of lawyers with their traditional modes of thought, and, on the other hand, such relatively modern creations as the American judicial system, American bar associations, and American law schools. In the final outcome, it may be hoped that all these social agencies —all, of course, in a greatly perfected form—will be found assisting and fortifying one another.

Encouragement for this hope may be derived from the fact that two of these agencies—the American Bar Association and the Association of American Law Schools—after years of playing at cross purposes, have finally, and quite recently, united their efforts for reform. Already, the joint movement launched by these two organizations in 1921 has produced results of value, even if not all that its more sanguine promoters hoped. Under its influence the number of full-time law schools that demand for their degree at least two years of college work followed by three years of professional study has been increased from 28, or 19 per cent of the total number of law schools, in 1919–20, to 70, or 40 per cent of the total number, in the autumn of 1927.

The situation as regards bar admission requirements is less satisfactory. There are still fourteen states in the Union that do not require applicants for admission to practice to show that they possess any definite amount of general education, and eighteen more that do not require applicants to be qualified, as regards their general attainments, before beginning their difficult and time-absorbing professional studies. Only six states—Colorado, Illinois, Kansas, New York, Ohio, West Virginia—insist, or shortly will insist, that all applicants show that they have a general education roughly equivalent to two years of college work, before beginning the study of the law; and in several of these states it is to be feared that the regulations are such as to admit young men and women who are far from possessing the qualifications intended by the sponsors of the movement.

Even in the field of bar admissions, however, there has been distinct improvement, notably a growing tendency to insist upon a carefully supervised educational process, rather than to rely upon an unsupported bar examination to test educational results. This improvement is likely to become more rapid in proportion as the various agencies implicated recognize that the proper preparation of lawyers constitutes a political as well as an educational problem; and—a necessary corollary of this attitude—in proportion as the public at large are brought to interest themselves in securing better trained public servants.

Bar Associations in the United States

By WILLIAM D. GUTHRIE, A.M., LL.D.
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A HISTORY of the American Bar during the past sixty years and any comprehensive and adequate study of the status, duties, services and progress of the profession during that period would require the review and analysis of several unprecedented phenomena which have been the more or less immediate causes that have tended to create the necessity for and to promote the organization and usefulness of bar associations. Such phenomena are the unprecedented growth of population, commerce and wealth, the change from agriculture to manufacture and commerce as the predominant industries of the majority of the people, with consequent concentration of the inhabitants of the country in cities, the constantly increasing complexity of business and social pursuits and relations, the confusion and uncertainty caused by the multiplication of statutes both Federal and State, the development of colleges and law schools, the great increase in the number of lawyers, especially in the larger cities, and the urgent necessity in the interest alike of the profession and of the public of higher standards of professional education, training, qualification, conduct and service.

It will be impracticable in this necessarily short and incomplete review to do more than to refer as above most cursorily to these phenomena which have created the principal contemporary problems of legal education and the necessity for better preparation and expert training for admission to the bar and for the maintenance of higher standards of professional conduct and service.

According to the latest Federal Census, that of 1920, the number of lawyers in the United States was then 122,519, of whom 18,473 were listed as in the State of New York, 4954 in Massachusetts, 6784 in Pennsylvania, 6485 in Ohio, 8843 in Illinois and 6745 in California. Since this census, the number has greatly increased, and the total number at present is believed to be in substantial excess of one hundred and fifty thousand throughout the United States. It is estimated that there are in the State of New York alone more than 30,000 persons who are entitled to practise law. Some conception of the rate of increase in that State may be gathered from the figures of admission to the bar in the City of New York, where, during the course of the past year, there have been 1844 admissions, viz.: 905 in the First Judicial Department (comprising the counties of New York and the Bronx) and 939 in the Second Judicial Department (comprising the counties of Kings, Queens and Richmond). Most of these applicants were graduates of law schools; but a majority had never attended college and had only the educational training of a high school with such study as was necessary to enable them to pass an examination by the Regents of the University of the State of New York, or its equivalent, as provided in the Rules of the Court of Appeals. A comparatively few, that is 56, were admitted on motion without bar examination because each was

already a member of the bar in another State and had there practised at least five years.

DEVELOPMENT OF LAW SCHOOLS

The development of university law schools, followed by what are known as "part time" and night law schools, has been remarkable, and has undoubtedly been an important immediate factor in offsetting inadequate and low requirements in the various States for admission to the bar, although the principal factor in improving standards for admission has, in my judgment, been the organization and activities of bar associations as mentioned below.

There are at present six law schools in the City of New York, with an enrollment of over 10,000 law students, and all of these law schools, except the Columbia Law School, have afternoon and evening sessions for the accommodation of those who are employed in law or business offices or otherwise during the customary hours of college instruction and who generally can give only part of their time to attending lectures and studying law.

HIGH STANDARDS FOR PROFESSIONAL SERVICE

The article of Dr. Reed of the Carnegie Foundation for the Advancement of Teaching, entitled "Training for the Bar," which I have had the privilege of reading and which is to be published in this volume, reviews the difficult problems of education and regulation for admission to the bar that exist under a federal system with forty-eight separate States each having full power to admit applicants, and he suggests lines upon which improvements should in his judgment be promoted. This article is an instructive supplement to his essay on the historical development of the profession and the principal contemporary problems of legal education and expert training for the bar in the United States, which was published in 1921 as Bulletin No. 15 of the Foundation. In both the present article of Dr. Reed and in his essay of 1921 there are general statements in regard to bar associations, national, state and local, which, I think, ought to be qualified as altogether too sweeping. He is in error when he implies that the difference between members of bar associations and the body of lawyers outside of such associations has little real importance in the eyes either of the legal profession itself or of the public at large. Quite the contrary is the fact, at least so far as the American Bar Association and a number of the state and local associations are concerned. It is true, as he states, that bar associations are usually selective, but the principle upon which they generally make their selection of members is perfectly clear and so far sufficient and sound, and that is, the test of good moral character and good repute and standing in the profession; and this standard has been as a general rule fairly, impartially and liberally applied. There have been some mistakes; but that is reasonably inevitable in such organizations, and they have been so few as to be negligible and not to justify any generalization or condemnation of the selective system. Whether bar associations should ultimately fix standards of admission based upon education or scholarship or college training is very doubtful, although many competent observers seem inclined to the conclusion that a requirement of at least two years' actual attendance at a college should be a necessary qualification not only for admission to membership in bar associations but for admission to the bar. It is argued that, with constantly increasing facilities for attendance at college and free tuition or ready

means for a student to work his way through college, no hardship or injustice will ordinarily result to ambitious and deserving students. Whilst I am clear that better education than is now required has become quite essential, if not imperative, I am not prepared to assert the conviction that more searching tests and severer examinations of non-college students as to their general education before they were allowed to commence the study of the law might not be sufficient.

The development of better education and more expert training is a problem which must be dealt with primarily at the source, and progress is being constantly though slowly made in that direction as the result principally of the constant labors of the American Bar Association and state and local associations acting in coöperation with the better law schools. The control of education and preparation for the bar and the consequent duty and responsibility have never been vested in the profession but in the several legislatures or in the courts, and any attempt of either to make the rules so stringent as practically to exclude from the profession students of little or no means who have not been able to attend a college might meet at present insurmountable popular objection, if not resentment, as an attempt to create a privileged class limited to the well-to-do and to exclude worthy men and women from the profession, who, it will be asserted, could acquire the necessary education through private instruction and study and the necessary expert training in law offices. However imperative the necessity for higher standards of expert training for admission to the profession may be, in the interest alike, as stated above, of the profession and the public, it must ever be borne in mind that there are obstacles to creating a privileged self-governing professional class such as is found in the English and French Bars. Too much uncritical sentiment in favor of democracy and free opportunity and too much repugnance to the violation of what many call our political philosophy stand in the way. There is, however, a marked tendency towards improvement in the requirements for admission to the bar, and this tendency is being constantly cultivated and given impulse and direction by the activities and services of most of the bar associations and law schools.

RENDERING A GREAT PUBLIC SERVICE

If the limit of this outline permitted, it would be instructive, and would refute many criticisms, fully to review the work done by the leading bar associations and the valuable services rendered by them. Reference can only be made to three of these bar associations, that is, the Association of the Bar of the City of New York, organized in 1869–1870; the New York State Bar Association, organized in 1876–1877, and the American Bar Association, organized in 1877–1878. From the activities of these three associations the useful service which is being rendered by bar associations can be fairly determined.

In December, 1869, at a time of great public demoralization and political corruption, culminating in what is known historically as the Tweed Ring Scandals in the City of New York, the profession in that city organized for the immediate purpose of removing abuses in the administration of justice that threatened the foundations of society in the City and State of New York and constituted as well a national menace. An organization of leading lawyers then successfully rendered a great public service by purging the bench and enforcing higher standards of professional conduct and ethics. An associa-

tion composed of members of the bar of the City of New York was thereupon organized and dedicated to the purpose of sustaining the profession in its proper position in the community and thereby enabling it, in many ways, to promote the interests of the public. This organization was later incorporated by special act of the New York Legislature in April, 1871, under the name of "The Association of the Bar of the City of New York," "for the purpose of maintaining the honor and dignity of the profession of the law, of cultivating social relations among its members and increasing its usefulness in promoting the due administration of justice." This declaration of purposes was amended fifty-three years later, in 1924, so as to read as at present, viz.:

> For the purposes of cultivating the science of jurisprudence, promoting reforms in the law, facilitating the administration of justice, elevating the standard of integrity, honor and courtesy in the legal profession, and cherishing the spirit of brotherhood among the members thereof.

The total number of active members of the Association is now 2740, in addition to whom are 803 associate members (being lawyers residing and practising outside the City of New York), 85 honorary members, and 35 exempt members, or a total present membership of 3663. It has 30 standing committees and 27 special committees with 565 members serving on them. If activities of these various committees could be detailed in this article, they would convince any impartial investigator that the Association has rendered and is rendering highly important and effective public services.

The prestige and influence of the Association both in the eyes of the profession and of the public have arisen from the work of these committees, and the aggregate of voluntary and unrequited public service rendered by their members, nearly all of whom are in active practice, is prodigious.

In truth, public service has always been the controlling and vivifying spirit of the Association and the source of its importance, prestige and influence in the public eye, and at no period has greater or more expert public service been rendered than during the past few years, or has its public influence been greater.

At the celebration of the semi-centennial of the foundation of the Association in February, 1920, Mr. Edward W. Sheldon, for many years a member, presented a history of the Association, and recounted its achievements and the importance and high quality of the services rendered by its members during the fifty years that he was chronicling, and its constant successful efforts to uphold high professional standards and professional ethics. With fine spirit he emphasized the duties which its members must perennially perform, and in conclusion said:

> The future activities of the Society, guided by the experience of the past, unfold themselves clearly and urgently. But the members should not be content with this. The needs of the time call for an enlarged program. As conditions following the Civil War had a potent effect in the formation of the Association, so the sequels to the World War present new dangers and new duties. To deal with these effectively the bar can find no better inspiration than the example of their predecessors who brought the Association into being. . . .
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> Under that leadership the community had striking proof of what a high-minded, courageous and united bar could accomplish in a grave civic crisis. The legend on the corporate seal, a replica of which hangs in the meeting hall of the Association, concludes a sentence from the "Politics of Aristotle" which may be rendered: "Where the laws are not enforced, there can be no

free state, for it is essential that the law be supreme." These words are as profoundly true now as they were when written twenty-two centuries ago. In the present national and world ferment the cause of justice and righteousness and peace may have need of another spiritual uprising by the profession specially charged with the regulation and enforcement of government by law.

What has been above said of the Association of the Bar of the City of New York may likewise be said of the services of the American Bar Association and of the New York State Bar Association, as well as of a number of other state and local bar associations. It is impracticable in the limited space allotted to this article to set forth their many public and patriotic services and their salutary activities constantly increasing in quantity and quality. There are no manifestations more progressive or more encouraging than these public services and activities of bar associations. Their annual reports will give some idea of the public importance and value of their labors. Few important statutes of general interest and effect are enacted by Congress without the expert advice and collaboration of the American Bar Association, and few important statutes are enacted by the Legislature of the State of New York without the expert advice and collaboration of the State Bar Association, or of one or more of the local bar associations.

Indeed, it may be confidently asserted—and such is the view that has been repeatedly expressed by competent visitors from abroad—that in no other country and under no other system of bar organization has the profession rendered any public service or exercised any public influence at all comparable to the public service being rendered and the influence being exercised by the leading bar associations of the United States.

Last year, 1927, the New York State Bar Association completed its semi-centennial of service, and an examination of its Year Books will furnish an instructive history of patriotic service in almost every field of legal activity, which directly or indirectly beneficially affected the personal interests of every class of inhabitants.

SEMI-CENTENNIAL OF NATIONAL SERVICE

This year the American Bar Association will celebrate its semi-centennial of national service. Its history furnishes an exceptional and splendid record of the development of fine traditions and commitments, which will well repay all the attention which historians or students of bar associations may devote to it. Its well-known and scholarly Journal has recently referred justly to the history of the American Bar Association as in large extent the history of the Nation for fifty years viewed from the legal angle, and its Journal and Year Books contain many scholarly contributions of permanent and historical value. No one can examine these volumes without being profoundly impressed by the great amount of expert and scholarly service being constantly rendered by its officers and committees; and it is a source of regret that it cannot in this article be shown in detail.

CONCLUSION

As has been truly said, the lawyer's part in public service and the governance of the State is not to be determined by what he does in the public eye. It is not all found recorded in statutes or law reports; nor is it confined to what is published in the press. He labors among the numberless obscure who do so much of the real and necessary work of society. Yet the lawyer's services are none the less

valuable and none the less influential and fruitful because unknown and unappreciated outside the profession and members of legislative and official bodies. Study, collaboration with each other in bar associations, preparation to serve, advice and assistance to legislative committees and public officials are all in and of themselves true and real public services.

The labor, for example, of the Committee on the Amendment of the Law of the Association of the Bar of the City of New York has annually been enormous, for each year it studies and passes upon innumerable bills pending in the New York State Legislature. In this field of service, the influence of the Committee has been of incalculable benefit to the State of New York. There is not space to mention other committees of that Association whose services likewise exhibit a high order of legal scholarship and expert ability devoted to the public service, showing great opportunities greatly employed. The same is true of committees of the American Bar Association and of the New York State Bar Association. It would take an essay in itself to narrate the services of each of these active bar associations.

The times are stirring the profession to broader studies and service, and the scholar at the bar may be coming into his own. Nowhere is this more evident or encouraging than in bar associations. If the progress has been and is slow, we must never forget that the Common Law and the system under which the profession practises in the United States has developed through the centuries very slowly, step by step, by practical experience and experiment and from actual litigation—from the labors and the arguments of counsel and the decisions of judges seeking sound, practical and just rules to regulate human relations.

The purpose to which the bar associations of the country are primarily dedicated is to inculcate the spirit of public service among their members as of so much more real and lasting importance than service to clients and to instil a fuller appreciation of the truth that reform and progress in our systems of law and procedure must depend upon an expert and scholarly bar and a bench recruited from such a bar. There cannot hereafter permanently be efficient and great courts, whether national or state or local, without scholarly and competent bars ever determined through coöperation and collaboration in bar associations and law schools to contribute, in the full measure of their several abilities and opportunities, to the reform of our laws and their more efficient, impartial and just administration and to the maintenance of the highest possible standards of professional service and ethics.

Practical Experience in Controlling Members of the Bar Control of the Bar

By Raynor M. Gardiner
General Counsel, Boston Legal Aid Society; Former Secretary, Grievance Committee, Boston Bar Association

PRESENT methods of control of members of the Bar as a general thing are rather unsatisfactory. Many lawyers resent being called to account by a Bar Association of which they do not happen to be members. The fact that they are not members of the Association does not necessarily mean that they are not in every way perfectly reputable members of the Bar. In some States membership in the State Bar Association is compulsory. Making membership in the Bar Association compulsory prevents a certain amount of ill feeling that is bound to exist where lawyers are divided into two classes, those who belong and those who do not. In these States therefore the Committee that is investigating the conduct of a member of the Bar is investigating one of its own members. Lawyers usually have a feeling that to be called before the Bar Association Committee is a reflection on their standing. The fact that a vast majority of complaints are groundless is clear proof that it is no reflection whatever on the standing of these lawyers.

By far the best p'an of Bar discipline that has come to the writer's attention is that now in effect in the State of Washington. The State is divided into several districts. The Supreme Court appoints a Committee of Inquiry, the members of the committee serve without pay and their function is similar to that of a Master in Equity. Complaints before this committee are investigated and presented by a paid secretary, one for each district. The advantage of this system is to adjust the proceedings both in form and substance to the nature of an inquiry by the Court into the conduct of its officers and then place more directly in the hands of the Court any disciplinary measures. This system is being strongly advocated in Massachusetts but the Legislature has not yet seen fit to adopt it.

For some strange reason the Courts themselves have seldom taken the initial step in disciplining members of the Bar. This step is generally taken by State or County Bar Associations, who act through a Grievance Committee, or some such similar body. These committees hear complaints against lawyers who practice within their jurisdiction. Where there is good reason to believe a lawyer guilty of a breach of professional ethics the matter will be called to the attention of the Court by means of a formal petition. In large cities, such as New York and Boston, the Grievance Committee has a paid secretary, but as a general rule members and secretaries of these committees receive no compensation. Once a complaint is before the Court the presiding justice, if he does not dismiss the complaint as not proved, will publicly reprimand the lawyer complained of, or suspend him from practice for a definite period of time, or disbar him from practice altogether. Disbarment will almost invariably result in his being unable to practice law in any other State in the union.

Whatever method may exist in any

particular State of enforcing discipline, or however speedy or dilatory that method may be, its ultimate success or failure depends upon the judiciary. Many failures in discipline enforcement may be laid at the door of the judiciary. A lawyer who has embezzled money belonging to a client and who has made restitution before he comes before the Court for discipline is all too often excused and given a further chance. I have even heard the rather extraordinary reason for clemency advanced that the lawyer was of foreign birth and for that reason did not understand the standard of honesty and fair dealing that obtained in his adopted country. No Bar standards are possible unless judges hold all members of the Bar to the same high standards.

COMPLAINTS AGAINST LAWYERS

In the City of Boston there are some four thousand lawyers. The Grievance Committee of the Boston Bar Association during the year ending October 30, 1927, received 313 complaints against lawyers. Of all this large number of complaints only 26 were considered to be of sufficient gravity to be heard by the full committee. The great majority of all the complaints were adjusted by the secretary to the satisfaction of all parties.

Most complaints against lawyers are due to a lack of understanding on the part of complainants. It is only human nature for us to believe that our case is a good one. People who have had but little experience of the law brood over their rights such a long time that they are apt to be utterly biased and unreasonable. They feel that to lose is impossible. When, because of the fact that their case was not as strong as they thought it was, they actually lose it, it seldom occurs to them that the difficulty is with the case itself. Some of them rush to the conclusion that they lost because of the inefficiency or dishonesty of their attorney. This situation is repeated over and over again before the Grievance Committee. It is a most difficult sort of complaint to handle as the complainant seldom can be convinced of his error and for the rest of his life will spread the doctrine that lawyers are dishonest and that he himself is a living proof of the fact because he lost the best case that was ever heard of.

While the great majority of lawyers are honest there is a minority in every community that is far from honest. Unfortunately it is usually the most unscrupulous ones who are the most successful in evading trouble. The secretary of the Grievance Committee is usually very well aware that certain individuals are rather shady characters but he is frequently prevented from taking any action as it is impossible to prove what he believes to be true.

COMMON TYPES OF OFFENCES

Of the very small percentage of cases where the lawyer is guilty of misconduct the following are the most common:

(a) A lawyer who is very hard up is subjected to a desperate temptation when he has settled a claim for a client and the money he needs so much for himself and his family is actually in his hands. It is at this time that the majority of lawyers who go wrong get into trouble. The peculiar relationship of lawyer and client makes it possible for a lawyer to fail in his trust with an excellent chance that his failure may never be discovered. Too many men practice law with little or no financial resources behind them and when their practice is not successful, or they have unexpected family expenses due to long illness or some other misfortune, they are fit subjects for temptation that ultimately leads them to the embezzle-

ment of their clients' funds. Almost always in these cases the lawyer fully intends to make the amount good before its loss is discovered. In this he is no exception to the bank clerk or other employee who is misappropriating his employer's funds. The lawyers who undertake a case for a client with the intention of robbing him are few indeed. Embezzlement in cases that have come to my attention are generally the result of sudden impulse and because the lawyer in question is on the verge of bankruptcy. The number of young and struggling lawyers is legion yet it is remarkable how few cases there are where the funds of a client are mishandled.

(b) A type of case that is somewhat allied to embezzlement is that where a lawyer misrepresents to his client the amount for which his case has been settled. It is not a difficult matter to persuade an ignorant or careless client to sign a blank release running to a street railway company or to an insurance company against whom the client has a claim for damages. The lawyer can then fill in the real amount of the settlement and tell the client that he received a lesser sum and pocket the difference. Fortunately for the world at large lawyers who practice this form of fraud do not remain undetected for any great while. Clients have a great way of becoming suspicious and ultimately going to the defendant in the case and thus finding out the true amount of the settlement.

(c) The so-called "ambulance chaser" still exists although his methods are a little more subtle than they were many years ago. The ambulance chaser does not follow the ambulance today as he used to do in the good old days, but he has a working arrangement with enough doctors, nurses, police and others who are first to hear of accidents and he has an excellent chance to get a client very shortly after an accident has occurred. In fact, some of these gentry have become so brazen that they will frequently write to the defendant announcing that they represent X who is at present in a hospital, long before they have even made X's acquaintance, and occasionally they have the nerve to accept an offer from the defendant and go to the hospital with a release and blandly introduce themselves to X as his attorney. X is generally delighted that someone is taking such an interest in his case and raises no objection to being represented by a lawyer whom he has never retained.

Should the case be one that cannot be settled because the defendant is laboring under the belief that he has a defence to the action this type of lawyer can so frame the evidence at the trial that victory is fairly certain. The framing of testimony or the production of witnesses that were never at the scene of an accident is by no means unknown and is an extremely difficult thing to stop. Many tort lawyers will recall the story of the case in which a man was endeavoring to recover damages for being run into by a street car. He testified in the morning of the trial that he could not see the street car until just as it was upon him as his vision was obscured by a large coal truck. As a matter of fact his attorney well knew there was no coal truck anywhere near the accident. That afternoon the street railway company put the supposed driver of the mythical truck on the witness stand who testified that at the time of the accident he was fifty yards away from the street car and that the vision of the plaintiff was in no way obscured.

(d) While the "ambulance chaser" is a person almost wholly without ethics and has no conception whatever of the duty owed either to the court or his client he is at the same time a far more desirable citizen than the worst

type of the so-called criminal lawyer. To appear in criminal cases is not only an honorable thing to do but sooner or later usually becomes the duty of almost every member of the Bar. Every defendant is entitled to a proper defence and unless those accused of crime can find attorneys to represent them they have but little chance even though they may be innocent of the crime charged. Every large city contains a small group of lawyers whose business is almost entirely that of defending criminals. As one of them put it once, "While my practice is a lucrative one I find that I have a very changing clientele." These men are not interested in whether their client is guilty or innocent, nor are they interested in presenting his defence in the fairest possible manner, but they are primarily interested in obtaining every cent he has in the world. If he has nothing they scare his relatives into even mortgaging their furniture and personal effects in order to provide money for the defence, although in a great many cases any lawyer could tell them that the defence was quite a hopeless one and it would be far better for the accused to throw himself on the mercy of the Court. That these same lawyers by utilizing the resources of the criminal law to the utmost obtain the release of many guilty men there is no doubt.

FEES

The question of fees is one which most Grievance Committees approach with extreme hesitation. To set the fees of a practising lawyer is always a hard problem. Most Grievance Committees hesitate even to listen to a complaint in regard to a fee unless the fee is such a large one that it practically amounts to extortion. A client who believes he has been charged too much can always appeal to the Courts to adjust a fee which he believes to be unreasonable. It is the general attitude of Bar Associations throughout the country that the client should look to the Courts and not to the Association in all fee disputes. While this may be a sound way of looking at the matter it is not a very practical one as most Courts are extremely reluctant to find against a lawyer in a fee case. The client is at a further disadvantage as in order to sue his former lawyer he has to retain a new one and the new one of course is entitled to a fair fee for his work. Many lawyers refuse to take cases of this nature as they think it is unethical to appear against a brother attorney. The only practical way to handle the matter is for the secretary of the Grievance Committee to take the case up unofficially and endeavor to act as a mediator between the parties. If the fee is really too large the lawyer is generally willing to adjust it and if it is not too large the client should have the situation explained to him so he may realize the value of the work done by his lawyer. It is impossible to standardize legal fees as their size depends on a great many different factors. Looking up difficult points of law often takes a great deal of time and the client not being able to understand the matter at all fails to see why his case is so expensive. It may be a common feeling that lawyers charge too much for their services. The plain fact of the matter is that lawyers as a class are not exceptionally well to do. Men who have made fortunes practising law are extremely rare. The amount of money made by successful lawyers is as a rule far less than that made by business men of equal ability.

CONCLUSION

Having been secretary of a Grievance Committee for some five years I have had a pretty good opportunity to judge

lawyers as a class and am convinced that the standard of ethics among lawyers is far higher than the public believes. There are dishonest people in every profession. There is so much publicity about lawyers who are dishonest that people tend to forget the vast preponderance of lawyers who go quietly about their business dealing fairly by their clients and doing everything in their power to expedite justice.

Legislative Reference Work: A Summary

By J. H. Leek
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THE reasons for the establishment of agencies for legislative reference work are so numerous that they can only be summarized in a brief article. Democratic government results in legislatures composed of the rank and file of the people, for the most part without special qualification for the highly technical job of statute law making. The drafting of bills and the relation of new laws to the existing body of the statute law is a task of such difficulty that the ordinary untrained and relatively inexperienced legislator cannot be blamed for the innumerable defects and confusions that mark our laws. Add to the foregoing the rapid political turnover in the United States, and our detailed, complicated constitutional provisions regarding legislation, and it is easy to see why in so many states the condition of the statutes is chaotic.

These, however, are purely technical difficulties. Even if they could all be eliminated there would still remain to the legislator the tremendous task of making intelligent laws on a thousand and one matters of constantly increasing complexity. The successful working of political democracy was a relatively simple matter a hundred years ago, but the industrialization and urbanization of the country have brought in their trail a multitude of highly technical and complex problems which the modern legislator is called on to face and solve. Moreover, the latter must carry on his work under bombardment from various interests and organizations maintaining lobbies at the state capitol. If democracy is to survive, some means must be found of equipping the legislator with facilities for handling intelligently the problems thrust upon him.

The results of faulty and ill-informed legislation, from the standpoint both of technique and substance, come back upon the public in the form of endless and costly litigation. If the courts are sometimes charged with usurping legislative functions in their decisions, the reason is frequently that the statutes that the court is called on to interpret and apply are so vague and faulty that the duty of imbuing them with some meaning and order devolves upon the courts. The very volume of the law, which is such a large factor in making for confusion, is partly due to defective legislation in the way of repeals and amendments. There is no hope that these problems will merely work themselves out in the course of time, inasmuch as the whole tendency of events is toward an almost geometric intensification of the difficulties.

The Nature of Legislative Reference Work

The legislative reference bureau, called into being with the hope of aiding in the solution of this problem, had its origin in New York and Wisconsin. Its organization and functions vary from one state to another, but everywhere its function is to aid the legislator in the task of law-making. Its two most important activities are bill-drafting and library reference work, and these may be separated or combined under one organization.

Bill-drafting, of course, aims to meet the more purely technical difficulties of the legislator. A few expert draftsmen are retained, to whom any legislator may go with a project for a bill which he wishes to introduce. The legislator and the draftsman work out the details of the bill together, and the latter draws it up for presentation. This procedure eliminates the danger of technical unconstitutionality, but, of course, a draftsman cannot be expected to take any responsibility for the constitutionality of the substance of a bill. It very often happens, however, that the draftsman, because of his knowledge of the law and the decisions of the court, can advise the legislator pretty accurately as to the validity of his bill. There is no way of proving that the amount of unconstitutional legislation has been decreased by the work of legislative reference bureaus, but if the work is done with any measure of efficiency it is hard to see how such a desirable result could be avoided.

If bill-drafting were the only work of the bureau, the institution would tend to become a seasonal one, although in many instances legislators use its facilities in the interim between sessions for the preparation of bills. But in some instances the legislature makes provision for the utilization of the bureau's facilities all the year round. Nebraska and Pennsylvania, in particular, have directed their bureaus to prepare codifications of the law on various subjects. In Massachusetts a loose-leaf system is used for the compilation of the state statutes, and the bill-drafters are given the function of fitting the session laws in their proper place and noting all repeals and other relationship to previous legislation. By this method Massachusetts has evolved a scheme of what is practically continuous consolidation of the laws. In other states the work of preparing periodic consolidations of the laws has been placed in the hands of the reference bureau.

So far as its other main function is concerned, the bureau operates as a highly specialized library. It differs widely from the ordinary library in the nature of the material on its shelves. Books, for instance, will play a relatively minor part in legislative reference collections. The aim of the bureau is to make readily available material which will be of value in the preparation of proposed laws. The reference bureau, therefore, will specialize in fugitive material of such a nature as not to be found usually in the ordinary library,—for instance, newspaper clippings, magazine articles, speeches, papers presented before economic, political, or scientific organizations, university seminar material, doctoral theses, and so forth. And since the time element is very often an important factor, the bureau will put its material in such form as to be collectible on a moment's notice. In some cases, for instance, books will be cut up and valuable and pertinent portions filed away under appropriate headings.

This kind of work, of course, goes on as well during the interim as when the legislature is in session. Sometimes, however, the legislature imposes additional tasks, as, for instance, the pursuit of special studies on important matters coming up for legislation. In some cases the results of these special researches are published in the form of pamphlets and made available for the public at large. In states where the university is located at the state capital a close working relationship is established between the bureau and the university whereby advanced and graduate students work out research problems in the field of government under the supervision of the bureau, and the

results of the work are utilized by the latter. Much work of this sort, for instance, has been done in Wisconsin, Nebraska, and Rhode Island. The Illinois bureau did a vast amount of valuable work in the way of compiling information for the Constitutional Convention of 1919. Many other scattering functions have been entrusted to legislative reference bureaus in various states.

DIFFICULTIES AND DANGERS

The experience of reference bureaus over a quarter of a century makes inescapable the conclusion that the institution must at all odds avoid any participation in politics. The bureau can become too active, too zealous for its own welfare. Probably the two most outstanding and effective bureau directors in the country have been, respectively, Charles McCarthy of Wisconsin, and John A. Lapp of Indiana; and both of these men got into very serious difficulties with their respective governments. The difficulty is that a man who is actively interested in state government, and who happens to head the reference bureau, is too likely to take a personal interest in the progress of certain bills. These bills may be obviously and undoubtedly in the public interest, but if the bureau or any of its personnel seem to be taking anything more than a purely professional interest in the drafting of the bill and its subsequent fortunes, they are almost bound to run afoul of some group of politicians whose interests are adversely affected by the bill. The real merits of the issue will be overlaid by a smoke screen of political oratory, in which the main element will be a cry that the activity of the bureau is a perversion of representative government.

Furthermore, the bureau is sometimes a victim of our American theory of separation of powers. It is impossible here to go into a full discussion of problems of administration, but if the bureau is placed under the control of the legislative branch, and if, as so frequently happens, there exists a feud between that branch and the executive, the latter will probably distrust the bureau and will refuse to entrust to it any of the important administration measures it may want drafted. In such a case, the bureau may do a great deal of work, but it will be relatively unimportant, and will have little effect on the statute law. On the other hand, if the executive branch controls the bureau, it may incur the suspicion of the legislative, in which case again its usefulness may be curtailed. Something more serious than such an eventuality may, of course, occur: the disgruntled party to the controversy may make an attack on the bureau and try to abolish it, or at least to decrease its appropriations. Such was the experience of the Indiana bureau at one time, and others have also had trouble from similar causes.

It seems likely, however, that as the bureau becomes more and more an accepted institution in the state government, such attacks will diminish. What is most essential is that reference bureaus should build up and maintain such a code of professional ethics that their motives would be absolutely beyond question. That is no doubt a goal difficult of achievement in the United States, but it is one that several bureaus are approximating. In Great Britain the office of Parliamentary Counsel to the Treasury is recognized as being completely out of politics, and the tradition is so thoroughly established and respected that there is no thought of a change in that office when the political complexion of Parliament changes.

PRESENT STATUS OF LEGISLATIVE REFERENCE WORK

During the first few years of legislative reference experimentation there was, naturally enough, a great deal of variation among the bureaus as to methods of administration, functions performed, and so forth. In some instances the bureaus took upon themselves more than they could possibly be expected to perform efficiently, and the results were, of course, unfortunate. Extravagant predictions were made as to the immediate improvement to be expected in the statute law, and elaborate plans laid for the extension of reference functions,—such as the scheme of Senator Robert L. Owen for a sort of graduate school of government research in connection with a federal legislative reference bureau. Of late years, however, there have been comparatively few changes in organization or functions of bureaus. Legislative reference work seems to have achieved a more or less specific and definite niche in the structure of state government, and so long as that niche is well filled and there is no effort to occupy any additional space, an assured future may safely be predicted for it.

So far as results are concerned, there are several matters which must be kept in mind. In the first place, it is not usually practicable to force every member who wants to bring in a bill to submit it first to the reference bureau for formulation. Furthermore, even where a bill is framed by a reference bureau, there may be amendments added to it in the heat of debate which make the bill defective, and it may ultimately be passed in a form for which the bureau is not at all responsible. Consequently, even where there is an active and effective legislative reference bureau operating, it cannot justly be held responsible for the total legislative output. The task of measuring improvement in the condition of the statute law is not one which yields itself to statistical proof. Numerous prominent lawyers and politicians have expressed an opinion to the effect that reference work has wrought an improvement, but they are for the most part advocates of the work and it may be objected that they are merely seeing what they want to see. All that can validly be said, therefore, is that legislative reference work is logically conducive to an improvement in the technique and substance of the statute laws; but is that not enough to establish the value of such work?

Legal Aid Organizations

"Lobbyists for the Poor"

By Otto G. Wismer

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THE design of this thesis expels from the term "lobbyist" all inferences of illegality or impropriety. To influence legislation in any other manner than by open and public presentation of facts and arguments would be far beyond the contemplation of any legal aid organization. But to induce salutary change in law by proper and legitimate use of data that points to the need of such change, would seem to be a province, if not a definite duty, of legal aid organizations.

In many writings during recent years much has been said concerning the defects in the administration of justice. Somewhat less, but still a great deal, has been said about the poor man's access or lack of access to justice. The service of lawyers in discharge of their traditional self-imposed obligation to suffer no man to be deprived of justice for want of means to employ counsel, supplemented by the efforts of legal aid organizations, public defenders and voluntary committees, to provide counsel when otherwise unobtainable, opens the way to justice, so far as it may be opened in that direction.

However, in the stress of modern conditions of life, the obtention of justice for the poor, or rather the procurement for the poor man of his due or right, because the lone word "justice" implies that attainment, demands more than mere legal representation in courts and in dealings. It demands organized effort for obtainment of legislation in his behalf.

The present unionized era of leagues, societies, alliances, clubs, combines and cliques offers confederation for mutual support of almost any interest conceivable except the diversified interests of the humble in the application of general law. With united front the bankers, the brokers, the dairymen, the detectives, the sportsmen, the motorists, the innkeepers, the barbers, the mintgrowers, the Swiss bell ringers, *et al.*, may and do present their complaints to the legislature for adjustment.

With the whole world organized and sub-organized for the intermutual protection of the members of numberless associations of differing purposes, the varying interests must often clash. Obviously the advancement of one must often mean the suppression of another.

In this conflict the unpresented claims of the unassociated man of no means, whose name is legion, can not but fall before an array of assembled fact and argument adroitly presented in support of conflicting claims.

True that certain interests of certain organizations often coincide with interests of the poor. True also that organized effort supplied by labor unions and others does guard the poor man in a few specific interests pertaining to wages, employment conditions, workmen's compensation and the like. But such effort falls far short of embracing all branches of law. And there is a definite clash of claims whenever the

law in any of its phases fails to stand for justice to the poor.

The test of failure or success of the law lies, of course, not in isolated applications thereof, but rather in the collective results of many applications. Whenever collective results indicate a wholesale failure, by the same token they indicate the desirability and necessity of marshalling fact and argument for cure of the diagnosed infirmities. Space restriction forbids specimen recitals, and so suffice it to say that any legal aid attorney anywhere will upon request cheerfully enumerate remediable conditions in law as seen by him in the constantly recurring cases of the law's failure in some particular department.

LOBBYISTS FOR THE POOR

Assuming, then, the poor man's need of a lobbyist, who will the lobbyist be? Necessarily some institution already in existence. The time, attention and money of the laborer are fairly well exhausted in his pursuit of sustenance and shelter for himself and his family. Sometimes a slim margin may be left for security against unemployment or sickness, but not for organizing and supporting a lobbyist. Presently existing societies unfamiliar with the problems of the poor in law, or not designed for particular action to acquaint themselves with such problems are clearly ineligible. The essential qualification—knowledge of the plight of the poor in law—practically eliminates from consideration all but bar associations and legal aid organizations.

Bar associations do not have within their reach the collective experience of the poor in this, that, or the other branch of the law. Private attorneys acting separately come into contact with remediable conditions of the law as it affects the poor, but not frequently enough to arouse any particular concern about the correction of those conditions. Even though lawyers are in fact generous and charitable, knowledge of this generosity is not widespread among the penniless. Even when informed of its existence, the layman does not readily admit the genuineness of lawyers' altruism. Generally the poor man in trouble reflects, hesitates, then stays away from the private lawyer. As private lawyers seldom publish their willingness to work for nothing, or go out looking for charity cases, the bar associations do not see the collective results of the law's application to the poor.

Legal aid organizations, designed for the expressed purpose of helping through the perplexities of the law any person needing representation and unable to pay for it, attract to their doors the troubles and problems of the poor. Knowing that he will have sympathetic audience, that his particular difficulty will be given full consideration, in short that his problem is the *business* of the legal aid organization, the man without money has no hesitancy, no embarrassment, and indeed often enough some actual pleasure in going to see *his* lawyer at the Legal Aid Society. There his case is recorded and handled as may be many others of the same type.

Assume his case to be one of illegal distraint of personal property. He is unable to furnish replevin bond. Is such illegal distraint an occurrence common enough to afford a reason for establishment of a right to sue for possession without bond, with change of possession deferred until after judgment? Or if the applicant be a wife who with her children is being supported by the city or county while her husband languishes in jail under writ of capias to insure his presence at the trial of a civil suit, or to enforce pay-

ment of a judgment obtained against him in a civil suit, is the occurrence frequent enough to warrant abolishing of the writ or lessening the impediments against his release under a poor debtors act? Or if the client be a purchaser of a home under land contract, and loses the property for default in one monthly payment after paying more than half its value, is such disaster common enough to justify varying periods of redemption depending on percentages of purchase price remaining unpaid?

The answers to these questions and many others may be found in the records of legal aid organizations. All legal aid organizations speak a common language. The uniform standards of classification of cases, and the uniform system of recording data devised by the National Association of Legal Aid Organizations and adopted by all its member organizations, makes readily available the collective experience of the poor over all the country in many separate departments of the law. The legal aid organization should be the logical champion of the poor in the field of legislation.

While some of the legal aid organizations may point with pride to past accomplishment in the promotion of needed legislation, others have heretofore made practically no efforts in that direction. Not because they have been blind to the opportunity, but because the pressure of business in the individual representation of clients has restricted the use of their time to the performance of that function. However, they all reach with hope for future achievement.

To ascertain some of the past use of legal aid records in the promotion of legislation, and some of the accomplishments of legal aid organizations as lobbyists, resort was made to specific inquiry of several of them.

ACCOMPLISHMENTS OF LEGAL AID SOCIETIES

From the responses received it appears that much work along lines of preparing bills for enactment, serving on legislative committees of other organizations, appearing before committees of state legislatures, directing letters to legislative bodies, and lending of record statistics to other organizations, has been going forward in the legal aid societies of several of the larger cities.

The Legal Aid Society of Atlanta writes:

> We are putting all of our records behind the Georgia Children Code Commission and the Chamber of Commerce in their respective efforts to revise Juvenile Court Laws and Small Loan regulations.

The Cleveland Legal Aid Society has been instrumental in securing passage of laws pertaining to small loans, wage garnishments, small claims courts, service by mail, and other subjects. The attorney in charge has this to say:

> The records of our organization have been used as statistics for legislative action. Our records show constantly recurring cases of some particular type, and it has been our practice to tabulate these figures . . . with a view to making these facts available for publicity, legislation or other purposes.

The Legal Aid Department of the Society for the Protection of Women and Children, in Montreal, Quebec, acting as lobbyist, obtained for the poor, an increase from fifty dollars to two hundred and fifty dollars in exemption of household furniture from execution.

The attorney in charge reports:

> The records of this organization were used for statistical purposes for legislative action. We have compiled statistics for

the use of the Imperial Parliament in London, England, and we have every reason to believe that our figures will be useful in the future for similar purposes.

In Boston, an act providing that divorce or separate maintenance proceedings begun during the pendancy of criminal proceedings for non-support should not affect the jurisdiction of the criminal courts to proceed, was the result of efforts of the Boston Legal Aid Society. After reciting other specific legislation aided or brought about by the efforts of the Boston Legal Aid Society, its letter continues:

> Our records, of course, show constantly recurring cases of the various types shown on the standard record sheet used by this and other societies. These indicate problems which may well come to the attention of the legislature.

In connection with the "Loan Shark Bill" in Illinois, which was passed by the legislature, after efforts on the part of the Chicago Legal Aid Bureau in combination with others:

> The Legal Aid files were made use of in getting material to be presented to the legislators, and one of the Legal Aid attorneys was sent to Springfield to appear before the Legislative Committee which considered the bill.

From the Legal Aid Society of Rhode Island comes word that it has used the information contained in its records on the occasions of its appearance before the legislature in proposed laws affecting imprisonment for debt as it has worked out in the installment business, legislation for stricter divorce laws, legislation on the Small Loan Law of the Russell Sage Foundation and the law of workmen's compensation.

The Bureau of Legal Aid, Department of Public Welfare of Philadelphia, has been instrumental in securing the enactment of several remedial measures important to the man of modest means, and, as appears in the response of the chief attorney:

> In the matter of proposed rental legislation, . . . the statistics of the Bureau of Legal Aid constituted the only real facts presented to the committee of the legislature at this hearing.

Information comes from the Department of Remedial Loans of the Russell Sage Foundation, that during its campaign to secure passage of the Uniform Small Loan Law in several states, it was effectively assisted by testimony of legal aid counsel revealing the necessity for remedial legislation as shown by the experience and records of legal aid organizations. In the letter so reporting, special commendation is given the work of both the St. Paul and Minneapolis Legal Aid Societies in this regard, and the director writes that the most effective help from legal aid societies came in Ohio, from the Cleveland Legal Aid Society. He hopes to translate some of the experience of the Milwaukee Legal Aid Society into support for the Wisconsin bill now under consideration. Concerning the Legal Aid Society of Atlanta, the letter states:

> Major Boyd is waging a most courageous fight under the most difficult circumstances against the salary buyers in Atlanta. He is constantly making use of his files in this work.

The letter closes with this comment:

> Certainly the legal aid societies have been big factors in the fight against salary buyers.

The foregoing does not purport to depict all accomplishments of legal aid societies as lobbyists, nor all the work of any organization mentioned. Too, there has been much done along legis-

lative lines by legal aid organizations not herein named, but to avoid an overcharge of fatiguing detail, there is related here only enough by way of instance to point out the variety of past effort, and to demonstrate the possibilities of future activity.

PROGRESS OF LEGAL AID

Fifty years ago, when with the increasing complexity of life, the surge of conditions began to make plain the inequality of the poor in law, the field of "legal aid" widened. Perhaps it may be said that our Great Charter in its guarantee to every man of equal protection of the law has never operated automatically. Presumably the man without means to set in motion the machinery that produces his constitutionally assured justice has always been at a comparative disadvantage in law with his richer brother. But a hundred years ago his disadvantage lay mostly in his inability to pay counsel for representation in court. And in those times of even, regular, plain living, practically the whole disadvantage could be removed by the friendly and charitable assistance of individual members of the legal profession in specific cases when needed. That was the "legal aid" and perhaps adequate "legal aid" of the time.

Life became more intricate, more intense, more difficult, more commercial and the old kind of "legal aid" had to be supplemented by more systematic endeavor to assure every man equal representation in court, and in law. The field of "legal aid" widened to include organized bodies, legal aid societies, particularly designed to provide legal representation in court to the poor man, who by this time might otherwise be unable to procure it. But as yet his inequality in law that prompted the formation of legal aid societies rested chiefly in his inability to pay for the services of a lawyer in protecting his rights under existing laws framed for the equal benefit of all. The nations had not yet leagued together. The underworld had not then come out in the open with election slates for promotion of their interests. The present era of clubs and councils of clubs and associations of councils of clubs had not arrived. The legislators fairly well represented people in all walks of life, and were interested in the public weal.

In the present unionized age, the field of legal aid again widens. No longer does equal representation in court for the procurement of rights under existing laws make one equal in law. A man is not equal in law today whose only voice in its passage is his vote for a representative. A man is not equal in law today unless he belongs and pays taxes. Not to a city, county or state as a citizen of equal voice in the government, but to a club, league or association as a contributing member to the support of a lobbyist to protect his interests.

The varied interests of the poor in the *making* of general law, as well as in the *application* of general law require legal aid. That the legal aid organizations are the most logical champions available or possible in this cause seems undeniable. That they should become open and avowed agents in the lobbies of our legislatures, prepared to combat for the welfare, comfort and safety of the poor, would seem to be the next logical step in the evolution of legal aid.

Book Department

SELEKMAN, BEN M. *Postponing Strikes.* A study of the Industrial Disputes Investigations Act of Canada. Pp. 405. New York: Department of Industrial Studies, Russell Sage Foundation, 1927.

Public interest in the methods of settling industrial disputes is slowly but steadily increasing. Mr. Selekman's book gives an admirable description and appraisal of the Canadian system. The author traces the origin of the law of 1927 from early legislative efforts to the great coal strike in Alberta in 1906. Mr. MacKenzie King was sent to investigate this strike when it reached serious proportions. He secured a settlement and thereupon proposed a general plan for the government investigation of labor disputes of national importance in the coal mines and great public utilities. This plan, which became a Dominion statute, provides that upon application of either party the Dominion Government shall appoint a board of three members who will investigate the difficulty, seek to secure settlement by conciliation, and if this fails, shall render a report on the proper settlement, which report is then published by the government. Such a report is apt to secure the backing of strong public opinion. In each case a separate board is chosen, although the same men frequently serve on several boards.

The author points out several interesting features of the plan. No code of industrial principles has been laid down or developed to govern the decision of the boards. Oftentimes one board will reject the arguments accepted by another in a similar dispute.

In general the employers are fairly but not enthusiastically favorable to the act. The unions at first favored it, later opposed it, but since 1918 have on the whole been friendly. When in 1925 the act was declared unconstitutional, the Trades and Labor Congress of Canada representing most of the unions asked that it be reenacted in constitutional form.

The author gives interesting statistics of the Canadian Department of Labor from 1907 to 1925. During this time 640 applications were made for boards; 536 cases were handled under the act; 421 boards were actually formed, and over half of the reports rendered by such boards were unanimous. Of the disputes handled under the act, 473 occurred in public utility industries. In 90 per cent of these a strike was averted or ended. During the same period, however, there were 425 strikes in which the act was completely ignored. In 47 of the disputes in which boards were applied for strikes occurred in violation of the act.

On the whole the law seems to have succeeded in most public utilities, but to have failed in coal mining. This failure, however, cannot be fairly charged against the act itself inasmuch as the coal industry all over the world is in a state of chaos due to excess mines and men and the lack of effective organization in the industry.

What can the United States learn from the Canadian plan?

First, that conciliation is the preferred method of settling a dispute.

Second, the merits of a separate board for each dispute, compared with a permanent board for all disputes. The separate board avoids the risk of suspicion and antagonism so often incurred by a permanent board. It also leads to a choice of men who have distinguished themselves as successful conciliators. Such men are often called upon to serve.

Third, the growing rôle of public opinion in securing stability of industry.

Fourth, Canadian experience shows the futility of compulsion as compared with conference and negotiation under government auspices.

Mr. Selekman and the Sage Foundation have performed a real public service in presenting both detailed facts and a general appraisal of the Canadian plan. The book deserves to be and probably will be widely quoted in proposals for American legislation.

JAMES T. YOUNG.

HILL, HOWARD C. *Roosevelt and the Caribbean.* Pp. xii, 233. Price, $2.50. Chicago: The University of Chicago Press, 1927.

John Morley once said that Roosevelt was a cross between St. Vitus and the Ten Commandments. This work proves it.

Dr. Hill's book does not change our opinion of Roosevelt; it is, however, a most conscientious and valuable exposition of Roosevelt's policy toward Panama, Cuba, Venezuela, Santo Domingo and Central America. Almost every view expressed in the book is documented. The author has had access to important contemporary historical records and has used them assiduously—particularly the Roosevelt Papers now in the Library of Congress. He has appended an exhaustive bibliography.

Roosevelt went at things like "a bull in a china shop" (page 27). He was an opportunist (page 200) whose opportunism was guided by devotion to national defense —a passion with him. He was an opportunist not because he lacked vision, but because of his conception of the nature and limitations of democracy. He believed that "nine-tenths of wisdom is to be wise in time, and at the right time." His "whole foreign policy was based on the exercise of intelligent forethought and of decisive action sufficiently far in advance of any likely crisis to make it improbable that we would run into serious trouble" (page 200). Often he paid little attention to the far-reaching consequences of his action or to the problems he created for his successors—Cuba being the outstanding exception. Roosevelt was a man of practical affairs rather than a doctrinaire. On most occasions "he was pure act." This in no way contradicts the almost universally held opinion of him.

His Panama Canal policy showed more of St. Vitus; his policy in Cuba, Venezuela, Santo Domingo more of the paternalistic side of his benevolent imperialism—the Ten Commandments side. Dr. Hill has contributed to American history in showing that Great Britain, not Germany, was the persistent leader against Venezuela in 1902 —contrary to the general opinion and to historians' accounts. This book is a searching inquiry into the most important period in the history of American foreign policy.

Dr. Hill's judgment of Roosevelt and his Caribbean policies seems harsh. The author attaches undue significance perhaps to written records. Much of international diplomacy is not in the "litera scripta." They often conceal the facts. Roosevelt was more just and more conservative than the written records (even his own) indicate. He was merely impatient of restraint. "That this is ethically right, I am dead sure, even though there may be some technical or red tape difficulty" (page 164).

HARRY T. COLLINGS.
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LANGELUTTIG, ALBERT, PH.D. *The Department of Justice of the United States.* Institute for Government Research: Studies in Adminstration. Pp. 318. The Johns Hopkins Press, 1927.

Dr. Langeluttig's volume is a welcome addition to the notable accumulation of studies in administration which have been prepared under the general direction of the Institute for Government Research. "To present a clear and accurate picture of the functioning of the chief organization that enforces the law of the nation" is the purpose of the author as he states it in his preface.

The volume evidences painstaking scrutiny and examination of the federal statutes regulating the organization and work of the Department of Justice. The writer has exercised good judgment in confining his discussion of the history of the office to an introductory chapter of seventeen pages. Too frequently such descriptive studies are cluttered with historical details that have very little significant relation to the present functioning agency. It is the opinion of the reviewer, however, that the writer has failed in some respects to live up to the purpose he set for himself in his preface. In picturing the Department of Justice as a functioning organization, it is difficult to justify omitting from the discussion the realities of an administrative situation, which, during recent years, have evoked such bitter denunciation from both Congress and the press. Again one can scarcely give an intimate picture of the functioning

of an administrative agency without giving some attention to the factor of personnel. By reason of these omissions the work lacks a certain punch and vitality which it might otherwise have had. The relation of the Attorney General to other national law-enforcing agencies is a subject which might have received more elaborate treatment. While the author makes certain mild suggestions looking toward improving the work of the Department, in his entire discussion he is for the most part very uncritical.

Part I of the volume, which deals with the history, organization, and functions of the Department, is well organized and well written. In addition to discussing the history and internal organization, the section includes chapters on the Duties of the District Attorneys, Marshals, and Clerks of the Federal Courts; chapters on the United States Prisoners, the Control of Litigation to which the United States is a Party, the Opinions of the Attorney General, and the Attorney General and Comptroller General. Part II considers briefly problems in the administration of federal law. The author recommends the creation of a Judicial Bureau under the general supervision of the Supreme Court which would conduct the administrative affairs of the entire judicial branch of the Federal Government. This work is now performed by the Department of Justice. Another suggestion is that one officer in each judicial district be made responsible for all the activities of the Department in that district. These suggestions together with others made by the author seem thoroughly sound and warranted by an examination of the facts. On the whole the volume presents an excellent description of the mechanism of our national law-enforcing agency.

MARTIN L. FAUST.

BEDFORD, SCOTT E. W. *Readings in Urban Sociology.* Pp. xxxiv, 903. Price, $5.00. Appleton, 1927.

This massive volume contains more than five hundred readings on a large variety of topics relating to the urban community. A great amount of labor went into the preparation of the volume. One must record, however, two fatal weaknesses: first, the scheme of organization is entirely too ambitious—a half dozen volumes would be required to give minimum space for clarity to this array of topics; second, many of the readings are woefully out of date. The reviewer is of the opinion that a student going through this volume would be stimulated, perhaps, but certainly he would be vastly bewildered. A reading of seven lines is not likely to aid greatly in the comprehension of a complex subject. Under the caption Drugs and Health the compiler has included certain propaganda material against alcohol as a medicine published in 1900. One leaves the book with the feeling that the clippings of many years have been brought together into a volume of readings.

HUGH CARTER.

Ruhrbesetzung und Weltwirtschaft; in Schriften des Weltwirtschafts—Institut der Handels—Hochschule, Leipzig, Vol. 3. Edited by DR. ERNST SCHULTZE. Pp. 256. Leipzig, Germany: G. A. Gloeckner, 1927.

Convincing statistical evidence of the economic disturbances in various countries of the world, traceable either directly or indirectly to the military occupation of the Ruhr district in 1923–1924, is contained in this series of investigations, made by financial and economic experts in sixteen different countries. Each investigator analyzes in more or less detail the immediate as well as the remote effects of the Ruhr invasion upon industry, commerce, price movements as well as upon financial and employment conditions in his respective country. Admitting the difficulty of tracing the general economic disturbances throughout the world in 1923 to a single factor, such as the Ruhr invasion, without giving due consideration to the effects of currency inflation in Germany, trade restrictions and efforts at deflation in other countries, the authors are quite generally agreed that the military occupation of the Ruhr was one of the costliest economic experiments ever attempted by man.

The effort to measure the actual losses to the nations of the world in monetary terms, due to the Ruhr occupation, which

is made by the Editor of the series, must, however, be accepted with decided reservations. With so many cross-currents at work in the complex world economy of today it is futile to attempt to make any precise quantitative study of the effects of a single influence. The general impression of commercial and industrial disorganization prevailing throughout the world in 1923, which is conveyed by the separate essays, illustrates very effectively the oft-voiced contention that the economic prosperity of all nations depends upon the prosperity of each separate nation. Any disturbing factor injected into the delicate mechanism of modern industry will make itself felt in the remote corners of the earth. By furnishing abundant statistical confirmation of this observation, the present work serves a very useful purpose.

KARL SCHOLZ.

HEWETT, WILLIAM WALLACE. *Rudiments of Economics.* New York: Thomas Y. Crowell Company, 1927. Pp. x, 247. Price, $1.75.

It is obvious that in a book of less than sixty thousand words nothing but the barest "rudiments" of economics could be presented. Moreover, when the "rudiments" are interpreted to include not only questions of method, of economic evolution, of present-day economic organization, of production, value and distribution, but also most of the "problems" like money and banking, stabilizing prices, the business cycle, international trade, waste and inefficiency, public finance, labor, economic progress and social reform, it is further obvious that the delineation of the rudiments must be in bold, sweeping strokes.

Yet it must be granted that Professor Hewett has done surprisingly well. He makes no pretense at adding anything to economic science; his sole endeavor is to express briefly the "real spirit of economic science." Some may wonder what that spirit is, while others who may believe that economics has a "spirit" may doubt that it finds a satisfactory incarnation in the familiar classical body of doctrine. But, never mind, most of the people who are looking for the "rudiments" of economics will be glad to find them just as they are exhibited in Professor Hewett's book.

E. E. AGGER.

Rutgers University

DAVIES, A. EMIL. *Investments Abroad.* Pp. vii, 200. Price, $4.00. Chicago: A. W. Shaw Co., 1927.

The keynote of the new book, *Investments Abroad,* by A. Emil Davies, is a warning to American investors to go slowly in the matter of investments in foreign securities. He calls attention to the magnitude of the investments made by United States citizens since the war, although he demonstrates very clearly that the war in this and many other things merely accelerated economic changes that were in slow progress before that time. While it may be true that the American invasion of the foreign investment market arouses jealousy in some quarters in England, the book can in no sense be regarded as propaganda designed to play upon American fears. The author shows convincingly the difficulties and disappointments attending the early ventures of the English investor in the foreign investment field and candidly warns the American investor of the dangers. His discussion of the subject of taxation, particularly, the chapter on double taxation is timely and of absorbing interest. The book is a valuable contribution in the field of investments.

R. STOYLE.

BIMBA, ANTHONY. *History of the American Working Class.* Pp. viii, 360. International Publishers Co., Inc.

In the preface, the author frankly states that he has not attempted to write an "impartial history" of American labor movements. He "openly takes sides with the working class against the bourgeoisie." The pages of the book are freely sprinkled with quotations; and the familiar phraseology of the left-wing socialist is always in evidence.

This contribution is important chiefly for its clear statement of the present program and tactics of the Workers (Communist) Party. The policy of dual unionism has definitely been dropped for that of

"boring from within." The revolutionary workers are to remain within the organizations of "backward workers" in order to get control of these unions. The reviewer wishes that all uncompromising opponents of American unionism might read this biased history in a sufficiently calm spirit to understand its implications. Undoubtedly one lesson would be: If serious labor difficulties are to be avoided in the United States, we must put our best efforts into analyzing industrial relations and into the investigation of personnel problems.

FRANK T. CARLTON.

DAVENPORT, EUGENE. *The Farm.* Pp. xviii, 462. Price, $3.50. New York: The Macmillan Company.

This is a splendid addition to the Rural Science Series edited by Professor L. H. Bailey. The book is a general discussion of the principles controlling agricultural operations. It covers atmosphere, the sun as a source of energy, climate as a controlling factor, the influence of season on yield, the making of productive soils, rainfall, organisms, drainage, cultivation, fertilizers, rotations, and agriculture as a national and coöperative enterprise. It is an all-round good general farm book. The author himself summarizes the substance of the book as follows:

What Nature has done to make farming possible.

What Man must do to make it profitable and permanent.

What interest society must take in the enterprise.

The book is simple in style and yet contains the wisdom of a Professor Davenport.

CLYDE L. KING.

MAYNARD, WEIDLER and BECKMAN. *Principles of Marketing.* Pp. 682. Price, $4.50. New York: Ronald Press Company.

The new book upon *Principles of Marketing,* by Professors Maynard, Weidler and Beckman, is a very thorough treatise of the subject of marketing. It seems, however, that this book emphasizes the need for a standardized terminology by those in the field of marketing and merchandising. Quoting the authors, they define marketing as "Impressing the entire group of services involved in the distribution of merchandise from producer to consumer." This is a very broad definition, and it seems as though the two most important forces in this field, advertising and salesmanship, have been neglected.

As one reads this *work,* keeping in mind constantly the authors' definition, it is a very thorough and well-written volume. For those who regard merchandising as a separate force the book falls short by reason of its distributive nature. It enters practically every field of business endeavor and gives a basic view of business which is all-inclusive.

The illustrative material in the book is of such a nature that *for* marketing courses there is practicality expressed which sets this book apart as particularly desirable for those who are becoming acquainted with marketing for the first time.

J. RUSSELL DAUBMAN.

MITCHELL, W. N. *Purchasing.* School of Commerce and Administration, University of Chicago. Pp. 385. Price, $4.50. New York: Ronald Press Co.

Mr. Mitchell's book is a badly needed addition to purchasing literature, because good treatments of the subject are rare. Improvements in purchasing technique are not new, as evidenced by the recommendation of Alexander Hamilton to centralize governmental buying. Yet the literature of the field is meagre, and aside from the books of V. C. Dinsmore and H. B. Twyford, the worth-while discussions are confined to isolated chapters in books dealing with other subjects, and to scattered articles in periodicals.

His book is to be commended for its completeness. It may seem unnecessarily discursive in the early chapters in which Mr. Mitchell rehashes the marketing background of his subject. However, the chief weakness of this useful book is its failure to emphasize the assistance that may be gained from a statistical department.

C. C. BALDERSTON.

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FOREWORD

THAT the development of standards in industry has been one of the most significant phases of the new industrial management has come to be known to even those who have but a passing knowledge of modern industrial conditions. Standards of product, of material, of equipment, and of performance, have come to be the bases on which the manager of today erects much of the coördination which distinguishes the business of today from that of just a few years back. They also form the groundwork of many steps towards better industrial relations. Standards are base lines of management, without them individual companies and whole industries find operating costs and attendant selling prices high, and with them the consumer shares in the accompanying prosperity.

For the general reader, who has not had a knowledge of the manner in which standardization has permeated the very fabric of industry, this volume of *The Annals* should provide interesting insight into the methods and extent of standardization. For those who have been giving their time and energy to standardization and simplification, this volume should provide a measuring stick to gauge the progress that has been made. That there are limitations to the extent of standardization is fully realized by all who have been associated in the work, and those articles which dwell on this phase should serve as a ready reference check on enthusiasms which carry a good cause to extremes.

Three great groups have been carrying forward standardization work within the United States. The United States Department of Commerce and the Chamber of Commerce of the United States have coöperated in leadership in simplification of product. The American Engineering Standards Committee, and its allied bodies, have led the development of materials and equipment standardization. The management societies have shared the leadership in equipment standardization, and have pointed the way to the development of performance standards in industry. Progress has been made in Canada and in Europe, and particular conditions on the Pacific Coast of the United States have called for particular methods.

The first part of this volume contains articles by the leaders who have brought about the work of these groups. In addition, it includes articles on the importance of standardization to the economic life of the country, the reactions of organized labor, and the contributions of particular groups to particular types of standards.

The second part indicates the manner in which specific industries have approached their standardization problems, and the progress that has been made. Such varied industries as machine shops, electrical goods, printing, textiles, music, filing equipment, gas appliances, and railroads, have varied problems that indicate that different approaches must be made toward solution. Although the industries which are included are only typical of many others in which progress has been made, nevertheless, they will serve to show the diversity of the problems which have been attacked and solved.

The third part indicates the widespread interest in standardization outside of industry. Although the standardization programs outside of industry affect industry itself, the gains that

are made are secured in as diverse conditions as those which obtain in government departments, the farm, the home, the hotel, and the hospital. Articles covering these phases have been included.

Part four relates to the interest of the consumer in standardization, and steps that are being taken by the government to protect the consumer through certification of standard specifications. Although it has been assumed that the consumer requires diversity to fill individual wants, this has not been borne out by recent study, and the advantages incident to sane standardization are indicated by the articles in this part, which have been prepared by men who have given intense study to this phase of the economic values of standardization.

RICHARD H. LANSBURGH.

Organized Effort in Simplification

By Ray M. Hudson

Assistant Director, Commercial Standards, U. S. Bureau of Standards, Department of Commerce, Washington, D. C.

EVER since mass production began to assume an important place in the science of manufacture, attempts have been made to reduce industrial losses by applying some form of simplification. These were, in most cases, sporadic, individual efforts of limited scope. In the last ten years, important advances in technique have broadened the field of application so as to embrace whole industries and to build up methods of maintaining a continuous sales pressure on behalf of simplification. Thus the principles of mass production have in a sense been applied to waste elimination itself.

While clearer and more general appreciation of the value of intelligent management is the underlying cause of this improvement, several other factors have contributed greatly to the present satisfactory state of affairs. Individual industrialists are showing a coöperative attitude toward their competitors that constantly astonishes observers abroad. Competition between industries has helped bring this about, but teamwork has also had an opportunity to demonstrate that many problems and difficulties are the common property of an entire business and may only be surmounted by group action. The activities of trade associations and technical societies are constantly widening in scope, and several agencies of the Federal Government are making useful contributions in fields to which their efforts may properly be applied.

Naturally this rapid expansion has been attended by excursions into numerous byways and the development of many new economic doctrines. Some conflict and overlapping has resulted but, when not maintained too long, has done little harm. Out of a wealth of new terms, three seem to have established themselves in the vocabulary of political economics as defining work which cannot be described as standardization. These terms are simplification, rationalization, and simplified practice. It is with the last of these that this paper deals because it signifies an organizing of simplification on a national scale. It means the voluntary action of an industry, or group of industries, with the assistance of the Department of Commerce, to eliminate waste by reducing unnecessary variety of sizes and types of stock products.

Post-War Conditions

The five years immediately following the World War were marked by a tendency on the part of industry to return to the old uneconomic conditions of over-diversity. Many products which had been simplified by the Conservation Division of the War Industries Board were again offered in a bewildering variety of sizes, types and shapes in an effort to break the "buyers' strike" of 1919 and 1920. In the scramble for sales volume during the industrial depression of 1921 this condition was so aggravated as to suggest a study of the situation with a view to possible remedies.

Waste in Industry

The Federated American Engineering Societies, through Herbert Hoover, its president, appointed a committee which made a careful survey of the

wastes in six industries which seemed to present typical conditions. The findings, printed under the title "Waste in Industry," showed the losses to be approximately as follows:

	Per Cent
Metal trades	29
Boot and shoe manufacturing	41
Textile manufacturing	49
Building	53
Printing	58
Men's clothing	64
Average	49

These figures indicated that practically one half of the material, labor, energy, and human effort expended in these industries was being lost, or wasted, *i.e.*, spent without tangible return. If, as the committee believed, the waste in these six industries was typical of all the industries in the United States, with their annual output of more than $60,000,000,000 of manufactured goods, it is easy to see the tremendous cost of this waste to the average citizen who, in the last analysis, must bear his share of the loss. It was recognized that all of this waste is not avoidable; some of it can never be overcome, but subsequent experience has proven that the total can be reduced. The major causes for waste in industry are:

1. Low production due to faulty management of materials, machinery, equipment, and men.
2. Interrupted production caused by idle men, idle materials, idle plants, and idle equipment.
3. Restricted production intentionally caused by owners, management or labor.
4. Lost production caused by ill health, physical defects, and industrial accidents.

In assaying the relative responsibility, the committee estimated that 50 per cent of this waste was chargeable to management, 25 per cent to labor, while the remainder was due to conditions not directly controllable by either group. Management has the greatest opportunity, hence responsibility, for eliminating waste in industry. The opportunity and responsibility of labor is no less real though smaller in degree.

Later, as Secretary of Commerce, Mr. Hoover organized several agencies within the Department to assist in eliminating avoidable waste. These activities are coöperative and function only at the request of the industry concerned. They operate on the principle that if the producers, distributors and consumers of a commodity can meet and develop a program of simplification which will be of benefit to all concerned, the Department of Commerce is glad to assist in securing its general adoption and in seeing that it is subjected to periodic review so as to keep it in accord with the best current practice.

This form of participation by a neutral agency safeguards the particular interests of each affected group, widens the scope of the program and affords the advantages of expert technical aid where necessary. The cooperation of non-governmental technical societies, of trade associations, and of allied industries permits organization not otherwise possible.

Simplified Practice Recommendations

As the country's largest consumer of manufactured products, the Federal Government, by coördinating its own requirements, is applying simplification to the purchase of commodities valued at $1,000,000,000 annually. This work is carried on through the Chief Coordinator, the General Supply Committee, etc. In many cases it is also possible to enlist the support of state and municipal purchasing agencies.

The development of a Simplified Practice Recommendation under the auspices of the Department of Commerce starts with a determination of the existing production and sales trends. This is ascertained through surveys conducted by committees which are appointed by the industry concerned, from its own membership. From these surveys there is drafted a tentative recommendation, which serves as an agenda for a general conference of all interests. This general conference of representative manufacturers, distributors, and users, discusses the individual items and phases of the agenda, from the viewpoint of each group represented, and then approves a recommendation that is satisfactory to all concerned.

Following the conference the recommendation is then presented to the entire industry by letter referendum for its approval and written acceptance. The publication and endorsement of the recommendation by the Department of Commerce is dependent upon acceptance of the program by at least 80 per cent by volume of each group concerned.

The Division of Simplified Practice of the Department of Commerce, since its establishment in 1922, as a part of the Bureau of Standards has promulgated recommendations, developed by the respective industries, which have effected the following reductions in stock items:

SIMPLIFIED PRACTICE APPLIED TO MILL SUPPLIES, SHOP EQUIPMENT, ETC.

Commodity	Formerly	Now	Reduction Per Cent
Files and rasps	1,351	496	65
Forged tools	665	351	47
Plow bolts	1,500	840	44
Sheet steel	1,819	263	85
Milling cutters			35
Die heads, self-opening			75
Grinding wheels	715,200	255,800	64
Average reduction			59

SIMPLIFIED PRACTICE APPLIED TO CONSTRUCTION MATERIALS

Commodity	Formerly	Now	Reduction Per Cent
Paving bricks	66	4	94
Asphalt	102	10	90
Steel reinforcing bars	40	11	72½
Metal lath	125	24	81
Woven wire fence	552	69	87
Asbestos mill board	10	5	50
Eaves trough and conductor pipe	21	16	24
Concrete building units	115	24	80
Sand lime brick	14	3	78½
Roofing slate	98	48	51
Average reduction			71

SIMPLIFIED PRACTICE APPLIED TO BUILDING MATERIALS, EQUIPMENT, FITTINGS, ETC.

Commodity	Formerly	Now	Reduction Per Cent
Face brick, smooth	36	1	97
Face brick, rough	39	1	97½
Common brick	44	1	98
Lumber, soft wood, yard sizes			60
Hollow building tile	36	19	47½
Builders' hardware	Items 26%	Finishes	71
Sidewalk lights—sizes	120	6	95
Paint and varnish brushes	480	138	71
Blackboard slates	251	25	90
Tacks and nails	428	181	58
Average reduction			72½

SIMPLIFIED PRACTICE APPLIED TO GENERAL SUPPLIES AND FURNISHINGS FOR HOMES, HOTELS, HOSPITALS, CLUBS, ETC.

Commodity	Formerly	Now	Reduction Per Cent
Beds, mattresses, springs	78	4	95
Bed blankets	78	12	85
Sterling silver, flatware	190	62	67
Tinware, galvanized and japanned	1,154	873	24
Milk bottles	49	9	82
Milk bottle caps	29	1	96
Hotel chinaware	700	160	77
Restaurant chinaware	668	177	73
Dining car chinaware	700	113	84
Hospital beds	67	4	94
Steel lockers	65	17	74
Average reduction			76½

SIMPLIFIED PRACTICE APPLIED TO PLUMBING

Commodity	Formerly	Now	Reduction Per Cent
Structural slate for plumbing purposes (Estimated)	....	..	84
Range boilers	130	13	90
Hot water storage tanks	120	14	88
Brass lavatory and sink traps	1,114	72	94
Average reduction			89

SIMPLIFIED PRACTICE APPLIED TO BUSINESS DOCUMENTS

Warehouse receipt, stock and delivery forms, etc.	Each previously made in a thousand different forms.
Invoice, inquiry and purchase order forms.	There is now one Standard Form for each of these documents.
Bank checks, notes, deposit slips, notices, etc.	
Average reduction	"99 44/100%" (Estimated)

Leaders of several of the industries affected have made the following estimates of the savings resulting from the above simplifications:

That simplified practice yields benefits sufficiently attractive to the manufacturers, distributors and consumers, is demonstrated by the high degree

Field	Varieties Reduced		Estimated Annual Saving
	From	To	
Paving brick	66	4	$1,000,000
Sheet steel	1,819	261	2,400,000
Reinforcing bars	40	11	4,500,000
Warehouse forms	3,500*	18	5,000,000
Range boilers	130	13	5,500,000
Builders' hardware	100% Items	74% Finishes 29%	10,000,000
Invoice, inquiry and purchase order forms	4,500*	3	15,000,000
Lumber—yard sizes	100%	40%	250,000,000
Total			$293,400,000

*Estimated.

ADHERENCE

The establishment of these recommendations is, however, only a beginning. Obviously the schedules must be followed or they will benefit no one. To assist in increasing the scope of application and maintaining adherence, the respective industries appoint standing committees from among their own memberships. The conference also fixes a period, usually from six months to two years. At the expiration of this period the whole program is reconsidered to see if any changes are necessary in order that the schedule shall conform with the best current practice of the industry.

of adherence shown the recommendations. Re-surveys of fifteen recommendations were conducted during the last quarter of the calendar year 1927 and showed an average degree of adherence of 82.61 per cent.

BENEFITS

An analysis of the advantages which have accrued to industry as a result of this movement may be briefly summarized as follows:

To the manufacturer, simplified practice means:

1. Less capital tied up in raw materials, semi-finished stock, storage space and repair parts.

2. More economical manufacture through larger units of production, reduced number of manufacturing units, larger runs, less frequent changes, higher rates of individual production, accurate and proper estimating for production, more effective stock control.
3. Better and simplified inspection, less idle equipment, reduced amount of equipment, greater ease in securing raw materials and conserving raw products, and cheaper handling of stocks.
4. Reduced clerical overhead, simplified and more accurate cost accounting system, elimination of waste in experimentation and design, standardized material inventories, more efficient labor due to making training of employes more simple.
5. Better earnings, through increased individual production, made possible by longer runs, happier and more contented workmen, skill increased by repetitive process, less labor idle from preventable causes, more permanent employment as contrasted to present seasonal employment, less difficulty in getting help.
6. Better service to the trade in better quality of product, more prompt delivery, decreased quantity of sizes of packing required, fewer packages broken in transit, less chance of errors in shipment, less obsolete material, more efficient sales force, increased rate of turnover, intensified sales momentum, easier financing, fewer factory shutdowns, compels attention to individuality in those features where there should be individuality, discourages attempts to apply it to those features where it is superficial and useless and where standardization and quality should prevail, earlier plans and schedules, and decrease in number of production processes.

To the distributor the adherence to simplified practice will mean:

1. Increased rate of turnover due to all live numbers.
2. Elimination of slow-moving stock, staple line, easy to buy and quick to sell, more effective sales force, greater concentration of sales on fewer items and standard patterns that are proven best sellers.
3. Decreased capital investment in stock on hand, repair parts on hand, storage space required, less stock depreciation and obsolescence, decreased overhead on handling charges, clerical work, better service through lower prices, quicker and more reliable deliveries.

Gains to the ultimate consumer through simplified practice are:

1. Better prices than would otherwise be possible.
2. Better quality of product through ability of manufacturer to concentrate on better design and through the reduction of manufacturing expenses.
3. Better service and prompter delivery of new equipment, replacements, and repair parts.

Further evidence that simplification is proving of great value to manufacturers and purchasers is found in the increased number of associations accepting the completed recommendations. The list of associational endorsers grew from 686 to 898 during 1927, the individual concerns, from 2,775 to 6,676. This means an increasing number of industrial purchasers are specifying simplified lines when buying, because they are finding that

such items are usually more readily obtained; that their quality is better; and, in many instances, by reason of the savings wrought through simplification, prices are lower. It must be remembered that savings from adoption of the simplified lines are obtained by the small manufacturers as well as the large, and also by the public.

A survey of the benefits to acceptors from simplified practice recommendations has brought to light many cases of definite money savings. One metal lath manufacturer reports reduction of $140,000 in his inventory, while a manufacturer of eaves trough and conductor pipe reports a $30,000 reduction in his inventory. One community reports savings of five cents per square yard, and another 25 cents per square yard, on its paving due to asphalt grade simplification. One lumber company reports reduction of $250,000 on its inventory, another $474,000 due to lumber standardization program. A manufacturer of concrete building units reports savings of $11,500 per year due to simplification in his field, while another reports savings of $500 in his office operations alone, and another states it has enabled him to reduce the selling price of his product 25 per cent. A manufacturer of die head chasers cites a 20 per cent reduction in his inventory, another 65 per cent. Many others report better turnover, quicker delivery, and improved service to the trade as benefits accruing from simplified practice.

ALLIED ACTIVITIES

American Marine Standards Committee

Within the Division of Simplified Practice there is a unit known as the American Marine Standards Committee, the activities of which embrace standards relating to the design, construction, and manufacture of hulls, machinery, equipment and fittings for ships and port facilities, also supplies for their maintenance and operation. This committee has completed twenty-nine marine standards as follows:

Glass for air ports and fixed lights; mooring bitts—cast iron; fixed lights for ships; rigging screws for ships; ship fittings for decks and riggings; cargo handling gear for ships; kinds and sizes of hose for ship equipment; specifications for ¾″ and 2″ flexible metallic hose; specifications for 2½″ double-jacketed cotton rubber-lined fire hose; specifications for 2½″ unlined linen fire hose; instructions for care and maintenance of steel hulls; general instructions for operation, care and upkeep of Scotch type marine boilers; kinds and sizes of mattresses and pillows and woolen, linen and cotton articles for ship equipment; kinds and sizes of glassware for ship equipment; kinds and sizes of silverware for ship equipment; distinctive markings for piping; specification for 2½″ single-jacketed cotton rubber-lined fire hose; essential machinery spare parts; accessories and supplies for sea-going ships; equipment and methods for safety on ships; general instructions for operation, care and upkeep of water tube marine boilers; condenser tube ferrules and tube sheets; specifications for pressure and vacuum gauges for ships; mooring bitts—cast steel; hubs for built-up propellers; fairwater caps for propeller hubs; propeller hub studs, nuts and lock screws; packing gland for propeller hubs; specifications for fire clay refractories for marine services; and lifeboat sizes.

COMMERCIAL STANDARDS GROUP

During the past year the simplification work reached the point, where more effectively to serve industry there was created within the Bureau of Standards, a "Commercial Standards

Group" under an assistant director of the Bureau, of which group the Division of Simplified Practice is now a part. The activities of this group will include the coördination of simplification and commercial standards programs with particular reference to the needs of an industry.

In addition, the correlation of the work of the Federal Specifications Board with commercial practice, and liaison duties with other branches of the Department of Commerce, and with other Government departments in questions relating to commercial standards, will be included in this group. In formulating plans and policies for the guidance of the activities of the Commercial Standards Group, the assistant director is aided by a planning committee, which meets quarterly in the Department of Commerce.

INTERNATIONAL ASPECTS OF SIMPLIFICATION

The value of the exports of the United States during the past three years averaged about four billions, seven hundred millions of dollars of which 43 per cent went to English-speaking countries; 17 per cent to Teutonic- and Slavic-speaking; and 30 per cent to Spanish-, French-, Italian- and Portuguese-speaking countries. This brings out the importance of translating certain of our standards into these foreign languages, wherever the commodity has a foreign market. Several foreign countries, whose volume of exports reach important figures, have distributed translations of their national standards abroad. The British have done some notable work along this line, expending, according to a statement of an official of the British Engineering Standards Association, more than 20,000 pounds Sterling for publications in Spanish, French, Italian and Portuguese languages and for the strategic spreading of these in overseas countries.

Obviously, the sponsorship for translating, publishing and distributing of American standards can be done more efficiently by one central agency than by a number of individual agencies. A group of industries and organizations have indicated that the work could be effectively carried out under the auspices of the Department of Commerce, which now maintains a field staff for promotion of commerce abroad.

The Relation of the Chamber of Commerce of the United States of America to the Growth of the Simplification Program in American Industry

By E. W. McCullough

Manager, Department of Manufacture, Chamber of Commerce of the United States of America

WE have acquired the habit of reckoning the dates of unusual happenings in business and industry within the last ten years from the World War. So may we even more properly designate that period as the beginning of the Elimination of Waste in Industry through Simplification and Standardization.

In the years just preceding the war there was a very noticeable tendency to multiply in commodity manufacture the variety of kinds and sizes in response to a demand, fancied or real, from distributors and consumers. "The Customer is Always Right" almost became a slogan in industry in carrying such service to the extreme. Factories were fast becoming custom shops in some lines through a competition which was permitting the buyer not only to depart from recognized standards but to specify such variations as his fancy might dictate.

This was the situation when the Government called for the coöperation of industry in the winning of the war. It was also one of the primary causes for the creation of the War Industries Board, a part of the Council for National Defense. I shall not attempt to review in detail the methods of the Government in handling its war planning, except to note that the Chamber in behalf of business took early cognizance of the planning and both tendered and rendered assistance at every step.

It was soon found that all ordinary methods of requisitioning supplies used in peace times were inadequate, and that industry as a whole should be mobilized, coördinated, and gotten into a coöperative state in order that there might be an uninterrupted flow of supplies.

Organization of Industrial Committees

In September, 1917, the Chamber, at its War Convention of American Business, held in Atlantic City, discussed the committee system and unanimously endorsed the idea that each industry should organize a committee of its own which should be properly representative in character to coöperate with the Government in every way. This conclusion was brought to the attention of the Council of National Defense for its reaction, with the result that the idea was heartily endorsed. The Chamber then emphasized to its membership the appointment of committees of this character, and succeeded in bringing about the organization of more than 300 of them, representing practically every important line of industry and a large number of minor or collateral lines.

The experience of the members of these committees, which were largely made up of executives of the several industries, opened their eyes as to the danger which they had been drifting into prior to the war in permitting the increasing of their varieties, which also meant the insidious reduction of volume, thereby decreasing their plant

efficiency and greatly increasing their costs. Following the signing of the Armistice and the gradual withdrawing of the hand of the Government in dictating production, there appeared a tendency toward returning to old ways, but this was checked effectively as will be shown by the Chamber and also the Department of Commerce.

SIMPLIFICATION DURING THE WAR PERIOD

During the operations of the War Industries Board, the varieties of sizes and kinds in many lines were drastically cut. Especially was this true in all articles required for personal wear. The number of colors of leather used in the making of shoes was greatly reduced, the quantities and shades of cloth in men's clothing were also curtailed. The varieties of farm equipment used in the production of raw foods were lowered. In fact, variety limitation was strictly enforced in practically all commodities approved by the Government as necessaries.

SIMPLIFICATION AFTER THE WAR PERIOD

The value of this war-time experience was not lost upon many members of these war service committees, and there soon appeared organized resistance within industry to check any tendency toward backward steps in again injecting into production a ruinous number of variations.

About this time—or, to be exact, in 1920—the Directors of the Chamber, at their annual meeting held at St. Louis, created eight service departments for the purpose of aiding members of the Chamber engaged in business and industry in dealing with their more intimate problems. These eight departments were designed to cover the following fields:

Civic Development
Domestic Distribution
Finance
Foreign Commerce
Insurance
Manufacture
Natural Resources Production
Transportation and Communication

These departments were placed under the direction of managers experienced in handling problems falling within the designation of their departments, and back of the manager was provided advisory committees of from ten to fifteen executives of outstanding concerns in business and industry, and back of these committees was the underlying membership of the Chamber, numbering approximately between six and seven hundred thousand organizations, partnerships and individuals, making up the underlying membership of the Chamber, all coördinated and coöperating for waste elimination in business.

Both the Chamber and the Department of Commerce seemed to have recognized the desirability of giving attention to Simplification in Industry simultaneously, for on the first program of the Department of Manufacture, Simplification and Standardization appears on its list of major activities. Shortly afterward, in coöperation with Secretary Hoover, the Manager of this Department was invited and accepted a place on the Planning Committee for the Division of Simplified Practice of the Department of Commerce.

From that time, and still continuing, this relation exists, although at this time to avoid duplication of activities, the Department of Manufacture acts more particularly as a liaison agency in promoting in industry interest in simplification, while the Division of Simplified Practice of the Department of Commerce, well organized, with an efficient staff and increased appropria-

tions, attends to the mechanics of the operation to reduce waste in industry through the simplification of varieties and the elimination of sizes, kinds, and varieties which have become obsolete. It is obviously a wonderful aid to progress in that through these eliminations room is made for initiative and improvement.

SIMPLIFICATION APPLIED TO THE BRICK INDUSTRY

In these joint efforts between the Department of Commerce—representing government—and the United States Chamber of Commerce—representing business—the first undertaking in simplification was applied to the paving brick industry. This was in 1922, and at that time the National Paving Brick Manufacturers Association determined by survey that its various members were making varieties in the aggregate amounting to 66 sizes, styles and kinds. The industry, at its request, was called together to consider the survey made and at the first meeting reduced these varieties from 66 to 11. There were present at that meeting, not only manufacturers, but road builders, municipal and civil engineers, trade publications representing the industry,—in fact, the doors were open to all who might have an interest in the undertaking. In keeping with the practice set up, a Continuing Committee was appointed to meet annually or oftener, as might be necessary, to re-survey the situation and determine whether the eliminations would remain as decided, or be adjusted to meet conditions developed during the interim. This Committee has met annually since, and the varieties have suffered further reduction to 4. But at the last meeting of the Committee, it was decided that the demand for thinner brick had so increased that at least two sizes should be restored to the schedule. Among the other commodities dealt with under the same plan and methods, the following are typical:

Beds, springs and mattresses reduced from 78 varieties to 4.
Metal lath reduced from 125 varieties to 24.
Hotel chinaware reduced from 700 varieties to 160.
Files and rasps reduced from 1351 varieties to 496.
Rough face brick reduced from 39 varieties to 1.
Smooth face brick reduced from 36 varieties to 1.
Common brick reduced from 44 varieties to 1.
Range boilers reduced from 130 varieties to 13.
Woven wire fencing reduced from 552 varieties to 69.
Milk bottles reduced from 49 varieties to 9.
Bed blankets reduced from 78 varieties to 12.

Nor has the work of waste elimination through simplification stopped with the large variety of commodities, but has followed through into methods and practices in manufacture, into office supplies, lumber standards, publications—in fact, almost everywhere that elimination and standardization will reduce costs and unnecessary overheads.

SIMPLIFICATION AN AID TO ADVANCEMENT

During the brief period covered by the last five years, we have witnessed the marvelous development of American industry, which has placed us in the front rank, as leaders, bringing with it prosperity to all classes of our people and placing within the reach of all, not only those things which are required to satisfy human needs under our present standards of living, but an abundant measure of so-called luxuries as well. In rechecking the causes which have contributed to our ad-

vancement and success, certainly Simplification is worthy of a place near the top of the list, for it has made possible our advance in standards of living many years before such a situation could possibly have obtained under methods and practices which existed prior to the war.

The Chamber of Commerce of the United States of America has recently taken another advance step in Simplification in establishing for its members a service by which business ethics may be advanced and trade relations established to meet existing conditions. Thus, step by step, American business and industry is progressing along better lines and our leadership will never be jeopardized while we have the vision to observe waste occurring and take practical steps to eliminate it.

Work of the American Engineering Standards Committee

By P. G. AGNEW
Secretary, American Engineering Standards Committee

THERE are literally hundreds of organized groups engaged in industrial standardization work in this country. By and large, this group standardization movement has developed during the present century. It has been a natural outgrowth of company standardization, which has been one of the most marked characteristics of our industrial growth.

Just as company standardization led to standardization by groups, so the latter inevitably necessitates intergroup or national standardization. The World War created a situation in all industrial countries which made clearly apparent the necessity of a national standardization clearing house.

The first step toward a national organization was taken in 1918 by five national engineering societies, which together with the U. S. Government Departments of War, Navy and Commerce, formed the nucleus of such an organization. Later, this nucleus was broadened into a federation of trade associations, technical societies, and Government departments.

The American Engineering Standards Committee is primarily concerned with national and international standardization. It is the agency through which industrial standardization in this country is passing from the second to the third stage, namely, from standardization by associations, societies, and governmental agencies, to standardization on a national scale. Through its method and procedure, which are the result of extensive study and discussion on the part of the numerous bodies concerned, and which have been further developed through eight years of experience, the standardization work of the many bodies concerned is being broadened and unified into a consistent system of national industrial standards.

NATURE OF THE WORK

A broad range of industries and of types of standards is covered. This includes:

1. Nomenclature. Definitions of technical terms used in specifications and contracts and in other technical work.
2. Uniformity in dimensions necessary to secure interchangeability of parts and supplies, and the interworking of apparatus.
3. Quality specifications for materials and equipment.
4. Methods of test.
5. Ratings of machinery and apparatus which establish test limits under specified conditions as a basis of purchase specifications, or which establish requirements as to performance, durability, safety, etc., under operation.
6. The codifying of provisions for safety.
7. Rules for the operation of apparatus and machinery in industrial establishments.
8. Concentration upon the optimum number of types, sizes, and grades of manufactured products.

METHOD OF WORK—MINIATURE INDUSTRIAL LEGISLATURES

The method of work is simply a systematic plan of coöperation by which all organizations interested in any particular project participate, (1) in deciding whether the work shall be undertaken at all, (2) in formulating the standard, and (3) in its ultimate approval as an "American Standard." The number of organizations having a substantial interest in any particular project is surprisingly large even in specialized subjects. For example, eleven national organizations were officially represented on the sectional committee which brought about national unification of specifications for railroad ties.

In more general subjects which may permeate a large number of industries, the problem is more difficult. For example, it has been found necessary in subjects like pipe flanges and fittings, or bolts and nuts, to accord official representation to thirty or more national organized groups. It is evident that in all such cases the detailed work must necessarily be done in subcommittees. In each of the three subjects just mentioned several years of intensive work were required to bring about a true national consensus. Agreement has been reached, after long and painstaking effort, on a group of detailed standards for bolts and nuts, and on another group for pipe flanges and fittings. In each case a uniform national specification was brought about by practically unanimous action in the sectional committee, and received formal approval of the central organization as an American Standard.

Each of these sectional committees, upon which all interested groups are represented, and in which decisions are reached, is essentially a miniature industrial legislature organized upon a subject basis instead of upon a geographic basis. This is equally true whether the subject is a safety code which may be adopted for legal regulation by a state commission, a quality specification for a building specification, a method of test to determine whether the material is in compliance with specifications, or a dimensional standard whose purpose is to secure interchangeability of parts and supplies.

After eight years of experience in active work the procedure has just been revised to make it more liberal and flexible. In the past, each sectional committee has worked under the administrative support and direction of one of the bodies most concerned with the subject. Such a body is called a "sponsor."

A special provision for the approval of existing standards has now been broadened to provide for the revision of such standards wholly under the direction of the originating organization, provided that a consensus of all those groups substantially concerned with the scope and provision in those standards can be shown. Such standards are said to be under "proprietary sponsorship." On the other hand, provision is now made for autonomous sectional committees, which will report directly to the central organization.

WORK ACCOMPLISHED

Thirty-six national organizations, including nine technical societies, seven departments of the Federal Government, and twenty trade associations, now constitute the organization. The American Engineering Standards Committee itself, usually referred to as the "Main Committee," which is the chief executive and policy-forming body, at present consists of sixty-three members, representing the thirty-six national organizations.

One hundred and three standards have been approved, and more than 160 others are in process. Following is a classified list of these undertakings:

	Number of Projects	*Number Approved*
A. Civil Engineering and Building Trades	34	14
B. Mechanical Engineering	72	26
C. Electrical Engineering	44	13
D. Automotive	5	4
E. Transportation	10	9
F. Naval Architecture, etc.	1	..
G. Ferrous Metallurgy	4	3
H. Non-Ferrous Metallurgy	10	6
K. Chemical Industry	8	6
L. Textile Industry	3	..
M. Mining	19	6
O. Wood Industry	5	4
P. Pulp and Paper Industry	2	1
Z. Miscellaneous	47	11
Total	264	103

A random list of standards approved will show the varied character of these projects: Specifications for Portland cement; a safety code for elevators and escalators; a method of sampling coal; permissible explosives for use in mines; a code for electricity meters; a safety code for aeronautics; standard screw threads; method of testing the toughness of rock; mathematical symbols; a safety code for automobile brakes.

In this work more than 300 national organizations are coöperating. Of these about 200 are trade associations.

The Government is interested in industrial standardization, not only as a purchaser, but through its great research and service bureaus. Seven departments are officially represented on the central organization, and thirty-five different branches are represented on sectional committees.

Of special importance is the Bureau of Standards, in which the Division of Simplified Practice now constitutes a part of the newly organized Commercial Standards Group. In the past the Division and the American Engineering Standards Committee have coöperated to avoid overlap and duplication. In general the American Engineering Standards Committee has concentrated upon projects involving technical considerations, while the Division has concentrated upon such eliminations of unnecessary types and sizes of products as may be carried out solely from a consideration of past sales data. Upon the organization of the new Commercial Standards Group, the American Engineering Standards Committee has suggested corresponding arrangements to prevent duplication of effort.

National organizations corresponding to the A. E. S. C. now exist in twenty countries, including all of those countries that are most important industrially. Coöperative contact with all these has been established; and publications and data on work in progress are regularly exchanged. In fact the organization of an international federation of these national bodies for closer coöperation is under way, though there are naturally considerable difficulties in bringing about so far-reaching an undertaking.

In the specification field the work has been almost wholly limited to raw and intermediate products, or at least to those purchased in sufficient quantity to justify regular testing or inspection on the part of the purchaser in checking deliveries. Materials going into the hands of the unorganized ultimate consumer involve much more difficult problems. Nevertheless, the growing importance of the subject, combined with reaction against abuses accompanying present distribution and advertising methods have developed considerable interest in the possibilities of the control of the quality of such products purchased by the man in the

street—and his wife. For example, the American Home Economics Association has requested the A. E. S. C. to undertake the preparation of national specifications for ordinary household refrigerators, and for sheets.

There is great need of local organization in each of the principal industrial centers to assist the local industries in taking full advantage of the national standardization movement, and in facilitating the solution of their problems in aligning their work with it. Excellent progress in this activity has been made in Cleveland, and similar local organizations are now in contemplation in Chicago, Philadelphia and Pittsburgh. An important step in the same direction is the issuance of a bulletin to the entire membership of the organization, including 330 industrial concerns which are sustaining members.

Notwithstanding the very substantial accomplishments in bringing about national consensuses on more than a hundred important standards, and the progress made on 160 other projects, probably the most important service rendered by the A. E. S. C. has been in breaking ground in so difficult an undertaking—getting a real national movement organized and under way—getting thirty-six important diverse national organizations, including seven departments of the Federal Government, to undertake responsibility for the movement—securing the official coöperation of over 300 national organizations.

Yet compared to the opportunities for service to industry and to the public, only a small beginning has been made. Consider the 27,000 specifications listed in the Directory of Commodity specifications issued by the Bureau of Standards—in some cases as many as fifty different specifications for a single commodity! It is an opportunity and a challenge to service in a national problem of major economic importance.

As a concrete example of how a successful attack is being carried through in a limited field, the reader is referred to Mr. Van Schaack's paper on the national safety code movement, elsewhere in this number of *The Annals*.

The last decade has seen amazing developments in industry. These are due primarily to increasing mass production and mass distribution. In both of these, standardization is an essential factor.

The opportunities for major contributions to the national economy by the standardization movement during the next decade are immensely greater than they have been in the past. The service to be rendered is limited only by the resources of the organized movement.

How far and how rapidly these opportunities will be met must depend upon the vision and the initiative of our industrial leadership.

Canadian Engineering Standards Association

By B. Stuart McKenzie, M.E.I.C.
Secretary, Canadian Engineering Standards Association

THE Canadian Engineering Standards Association is the national standardizing body for the Dominion of Canada. It is organized for the purpose of carrying on industrial standardization, but its sphere of operations is gradually being extended to include the development of what is commonly termed simplified practice, or waste elimination. It provides the machinery by means of which various industrial interests can be brought into agreement on Canadian standards, and, as a result of such agreement, it arranges for the publication of standard specifications which it recommends to Canadian industry as good business.

History

The Canadian Engineering Standards Association was organized during the latter part of the Great War, at the suggestion of the British Board of Trade and the British Engineering Standards Association, which latter was established in 1901 as the first national standardizing body. The organization committee of the Canadian Engineering Standards Association was formed in 1917, and on January 21, 1919, the Association was granted letters patent.

Some of the objects of the Association are enumerated in the charter as follows:

1. To coördinate the efforts of producers and consumers for the improvement and standardization of engineering products.

2. To promote the general adoption of engineering standards, and to revise and amend such standards when necessary.

3. To register, use and protect distinctive marks or names as applicable to materials or products which are in accordance with standards.

4. To make arrangements with governments, or other authorities, to obtain from them privileges or concessions conducive to the objects of the Association.

5. To appoint overseas representatives of the Association.

6. To do all such other things as the Association may think conducive to the attainment of its objects.

Organization

The organization of the Association is similar to that of the British Engineering Standards Association. The work is directed by a main committee, which appoints a Chairman, two Vice-Chairmen, and an Honorary Secretary-Treasurer, these constituting the Executive Committee. The detailed work is handled by a paid Secretary and staff, with headquarters at Ottawa. Nominations for membership on the main committee are received from such bodies as the Canadian Manufacturers' Association, Canadian Electrical Association, Institution of Civil Engineers, Engineering Institute of Canada, National Research Council of Canada, Canadian Institute of Mining and Metallurgy, McGill University, University of Toronto, L'Ecole Polytechnique of Montreal, and Trades and Labour Congress. Representatives from various departments of the Dominion Government are *ex-officio* members, and other members are coöpted from railways, engineering schools, important industrial firms and

associations, and consulting engineers.

Under the main committee, sectional committees are formed, one for each branch of engineering work. Membership on these committees is approved by the main committee, which takes special care to see that representation on each committee adequately covers the particular field of engineering concerned. At present there are seven sectional committees in operation and covering civil, mechanical and electrical engineering, automotive work (including aircraft), railway work, ferrous metals and mining machinery.

Under the sectional committees the work is carried on by various committees, each dealing with some particular problem in the field covered by the sectional committee to which they report. Members of these committees are selected from the industries concerned, both manufacturers and users, with a sufficient number of technical advisers to insure a thorough study of the question involved. Membership is, as before, subject to the approval of the main committee.

With the exception of the Secretary and his staff, all the members of the Association, and members of all committees, give their services without remuneration of any kind. The Association operated until 1925 with funds provided by grant from the Department of Trade and Commerce, supplemented by subscriptions received from various industrial firms and technical organizations. In 1925, however, on account of the imperative necessity for economy, the grant from the Department of Trade and Commerce was withdrawn, and the National Research Council, realizing the importance of the work being carried on by the Association, guaranteed its budget to a certain extent, with the understanding that Canadian industry should be asked to pay its share.

METHOD OF FINANCING

For purposes of financing, the Main Committee of the Association has now been constituted the Advisory Committee on Engineering Standards of the National Research Council of Canada. An annual report of operations is made to the Council, but otherwise the work of the Association is conducted on the lines followed since incorporation.

During the period of revival in 1925 and 1926, it was not thought advisable to make any appeal to industry for financial support. In the spring of 1927, however, the Association published its first Year Book, which contains an account of the history of the Association, a description of its organization, a list of projects for which specifications have been issued, or on which committees are working, and a list of industrial firms or other organizations who have been associated with the work by the appointment of representatives on working committees of the Association.

This book was sent out to these associated industrial firms with the suggestion that they coöperate in a practical way by subscribing to the operating budget. It was felt that a straightforward appeal based on the merit of the work itself would be much more effectual than any personal endorsement. This attitude has been amply justified, and it is gratifying to report that the objective set for 1927 was exceeded, and as a matter of additional interest the majority of subscribers have indicated their intention of subscribing annually. Speaking generally, about 40 per cent of the operating budget for 1927 was subscribed by industry, the balance being taken care of by the National Research Council.

POLICY

The Association does not act as a *dictator*, but is a purely *coöperative*

body. It must be guided in its operations by the requirements of the manufacturing and industrial interests represented on its various committees. It endeavours to follow British practice as far as possible, but, on account of established business interests, it is often advisable to follow other standards which have been generally adopted in Canada. In all cases, however, the specifications prepared are drafted to meet the needs and promote the best interests of Canadian industry, and are adopted as Canadian standards.

In many quarters there has been an impression that the Association is a governmental body with power to enforce its specifications on industry. On the contrary, however, the specifications issued by the Association represent the considered thought of voluntary committees whose membership is Dominion-wide and consists of representatives from both *manufacturers and users*, together with a certain number of technical advisers. No project is ever undertaken until a definite suggestion is received from a responsible source that the initiation of the particular project will be of practical benefit to industry.

The specifications make their appeal, and their very success depends, on their inherent merit and common sense, there being no idea of compulsion whatever. Specifications are subject to revision at any time in order to keep them up to date, and suggestions for revisions are always welcomed.

INTERNATIONAL COÖPERATION

On account of its association with similar standardizing bodies in twenty different countries, the Canadian Engineering Standards Association is enabled to keep closely in touch with the standardization movement throughout the world. Coöperation with Great Britain and the United States is naturally most essential, and specifications and correspondence are freely exchanged. Representatives of the Association frequently act as observers on committees of the American Engineering Standards Committee.

Copies of the Year Book, Canadian Engineering Standards Association Bulletin, and specifications, as issued, are sent to all the national standardizing bodies. Progress reports are exchanged periodically and items of international interest in the standardization field are noted from time to time in the Bulletin.

COÖPERATION WITH INDUSTRY

It is interesting to record the progress that has been made in attaining that friendly coöperation with industrial interests which is so desirable, in fact so essential, in promoting the work of industrial standardization. Reference has already been made to the practical coöperation experienced in financing the 1927 budget, but in other ways there is a marked evidence that the Canadian Engineering Standards Association has a useful field, and that industry appreciates the fact. During the past year and a half the chairman of the Association has, on invitation, addressed the Association of Canadian Building and Construction Industries, and the secretary, by invitation also, has addressed the Canadian National Clay Products Association, the Canadian Concrete Products Association, Canadian Paint, Oil and Varnish Association, the Montreal Metal and Hardware Association, the Sheet Metal Exchange, and the Steel and Power Show recently held in Toronto.

There have been many requests for representation on the various working committees, and on the main committee of the Association. Sales of publications have become active again, and many firms and individuals have asked

that they be put on the mailing list for all publications.

ASSOCIATION ACTIVITIES

Up to 1925 the Association published eighteen specifications, but during the latter half of 1925 and the early part of 1926 the work was conducted by a part-time secretary, which arrangement was, of necessity, a serious handicap to successful operations. A permanent secretary was appointed on April 21, 1926, and since that time it has been possible to properly organize the work and inaugurate a programme of expansion.

In order to give the reader a comprehensive idea of the variety of projects which are handled, a brief review of the recent activities of the Association is given herewith.

During 1926 and 1927 four publications were issued, of which the following is a brief description:

Items of Highway Expenditure.—The Association published in March, 1926, A19–1926, Standard Classification of Items for Highway Expenditure. This provides for a uniform system of accounting in connection with highway construction contracts. It has been favourably received and has proved of great assistance to highway engineers and government and municipal officials.

Control Cable in Power Houses.—This is one of the more recent projects, and was suggested by construction and operating men engaged in the erection and equipment of power houses. C21–1927, Standard Specification for Control Cable for Electrical Power Plant Equipment was published in August, 1927, and has already been used on large orders. It represents the work done by a representative committee of cable manufacturers and power men. Its chief feature is a color code which provides for the identification of fifteen different cables by the use of not more than two colors at any one time and a uniform design in the braid covering.

Movable Bridges.—This project was brought to a successful conclusion by the publication in October, 1927, of A20–1927, Standard Specification for Movable Bridges. This is an amplification of the section on Movable Bridges which appeared in the first specification for Steel Railway Bridges in 1920, and covers requirements pertaining to movable bridges of all types.

Canadian Electrical Code.—This is perhaps the outstanding item, and the publication in October, 1927, of C22–1927, Canadian Electrical Code, Part I, covering Essential Requirements and Minimum Standards for Electrical Installations in, on, or over Buildings Using Potentials of from 0–5000 volts, was something of an event in the Canadian electrical field. The work was recommended by a special committee of the Association in 1920. In 1923 a special interprovincial conference was called by the Department of Trade and Commerce, and in 1924 a working committee of the Canadian Engineering Standards Association was organized. The draft was prepared by electrical men specially engaged for the purpose, their expenses being taken care of, for the most part, by special subscription from electrical manufacturing firms, Fire Underwriters' associations, railway companies, etc. The Code was prepared under the supervision of committees composed of representatives from nearly every province, from underwriters' associations, power companies, electrical manufacturers and contractors, telephone companies, and various departments of the Government.

This Code is based on the National Electrical Code, the National Electrical Safety Code, Rules and Regulations of the Hydro-Electric Power Commission of Ontario and other provincial or

municipal regulations. Its prime object is to promote the adoption of uniform electrical regulations throughout Canada, a condition much to be desired. A somewhat unique feature is the provision for both fire and personal safety hazard, and the inclusion of rules for resuscitation from electric shock. For the proper operation of the Code in the meantime, it will be necessary for the different provinces to pass enabling legislation in order to give the necessary authority to their respective inspection departments. It is hoped eventually to secure Dominion legislation.

The Dominion Government has announced its intention of establishing extensive research laboratories at Ottawa, in connection with which arrangements will be made for the testing and approval of electrical apparatus under Canadian Code rules and specifications.

Working committees of the Association have now under consideration the following projects, many of which it is hoped to complete during 1928:

Brick Sizes.—As a result of a discussion held at the convention of the National Clay Products Association at Toronto, in February, 1927, a conference was called by the Canadian Engineering Standards Association at Ottawa on March 18, 1927. At this conference, representatives from the manufacturers, builders, engineers, architects, labour organizations and the Dominion Government Department of Ceramics were present. A resolution approving the adoption of two standard sizes of brick was passed unanimously, these sizes being 8 in. x 3¾ in. x 2¼ in. for common and rough face and 8 in. x 3⅞ in. x 2¼ in. for smooth face brick. Manufacturers in Ontario started manufacturing brick to these sizes on October 1, 1927, and in Quebec on February 1, 1928, but there may be a slight change in the size for face brick owing to a recent suggestion from the Association of Canadian Building and Construction Industries.

Steel Bridges.—Specifications published by the Association, and covering Steel Railway and Steel Highway Bridges, have been almost uniformly adopted in Canada. Owing to the constant demand it has become necessary to prepare for a third edition of the Railway Bridge specification, and a second edition of the Highway Bridge specification. Revised drafts are now under consideration by the respective committees, and it is hoped to issue the new editions early in 1928.

Steel Buildings.—A revised edition is now being considered, one of the chief items being the raising of the unit working stress from 16,000 to 18,000 pounds per square inch for tension. This is in accord with up-to-date practice and has already been unanimously approved by the committee.

Concrete and Reinforced Concrete.—The committee has prepared a draft specification which will shortly be sent out for approval. This specification covers materials, proportions, consistency and mixing, forms and placing, waterproofing and protective treatment, surface finish and details of construction. Special attention has been paid to construction conditions prevailing in Canada.

Machine Screws.—A committee has been at work on this important project since 1926, and the main object is the preparation of data sheets on which will be shown a simplified list of machine screws which will serve every practical purpose. A list of screws was prepared by the committee, which showed that there were 43 different machine screws on the market in Canada, many of them subject to very infrequent call. The committee have decided to eliminate 25 of these screws, thus reducing

the list to 18. When this list has been approved by the committee it will be recommended for all new work. If it is adopted, there will be a distinct benefit to the manufacturer in reducing storage space, encouraging mass production and reducing manufacturing cost. This in turn will benefit the user in securing lower prices and prompt delivery from stock.

Steel Castings.—This project was suggested as a result of serious trouble experienced with castings subjected to heavy duty in service. The committee has been working on this for some time, and a draft specification is now before the members for their comment. This draft has been modelled on existing specifications, but a special section has been added which deals with heavy duty castings and covers special provisions for heat treatment and tests.

It is felt that a campaign of education is necessary so that designing engineers will be better informed on modern foundry practice, that purchasing agents will consult with their engineering department before placing orders, that inspectors will properly understand what can be reasonably demanded of the foundryman, and finally that the foundryman will appreciate the important service demanded of certain steel castings and understand the reason for the demands made by the inspector. In the preparation of this specification, the most modern foundry practice has been considered, and it is interesting to note the great advance made in the casting art during the last five years.

Cast Iron Pipe.—A draft specification has now been prepared and is before the members of the committee for criticism. There seems to be a strong feeling that special emphasis be laid on physical tests of pipe, and that after all the chemical composition of the metal is of comparatively minor importance. This view is being strongly supported by the U. S. Bureau of Standards at Washington. There seems to be every prospect of somewhat radical revisions in pipe dimensions before long, but it would seem advisable to issue a specification in the meantime for Canadian use. The specification sponsored by the Engineering Institute of Canada is out of print, and there is no Canadian specification now available.

Traffic Signals.—Final draft of specification covering this project has been before the committee for some time, but has been held up on account of the difficulty of getting uniform practice in the different provinces with special reference to warning signals on the highways. In this work the Association has kept closely in touch with the Canadian Good Roads Association. A discussion was held at an Interprovincial Road Conference held in Quebec in January, 1928, at which representatives from the various provincial highway departments, the two railways, the railway commission and the Canadian Engineering Standards Association were present, and it is hoped to come to some satisfactory agreement in the matter at an early date.

Transformers.—The committee on transformers has concentrated its efforts on a revision of C2–1920, Standard Requirements for Distribution Type Transformers. It was found that this specification was not altogether satisfactory in practice, and a certain adjustment was necessary to bring the manufacturers and users more closely together. This revised specification is now awaiting final approval by the committee. In connection with the work on power transformers, the committee is now collecting data on voltages, and although it is a very difficult problem, it is hoped to frame a specification to cover this important field. A tentative draft has been pre-

pared and has been submitted to the committee.

Steel.—Committees have been working on specifications covering Sampling for Check Analysis and for Forging Quality of Bar and Billet Steel. Drafts have been prepared and are now before the members for comment and final approval is possible. It has been the endeavour to make these specifications as clear and concise as possible, and they are framed to meet Canadian conditions.

The above review covers the more important projects which are engaging the attention of the Canadian Engineering Standards Association, but suggestions for new work are being continually received and will be taken up in due course. Among items suggested are plow bolts, cap screws, glass bottles, paper sizes and pole line hardware.

PUBLICATIONS

The following is a complete list of the specifications issued to date, and copies may be obtained from the Secretary at Ottawa at any time:

No. A1–1928	Standard Specification for Steel Railway Bridges (third edition).
A1a–1928	Material Specifications, Steel Railway Bridges (reprint).
C2–1920	Standard Requirements for Distribution Type Transformers.
C3–1924	Standard Specification for Galvanized Telegraph and Telephone Wire (reprint).
B4–1921	Standard Specification for Wire Rope for Mining, Dredging and Steam Shovel Purposes.
A5–1927	Standard Specification for Portland Cement (second edition).
A6–1922	Standard Specification for Steel Highway Bridges.
D7–1922	Standard Specification for Flexible Steel Wire Rope and Flexible Strand for Aircraft Purposes.
G8–1923	Standard General Specification for Commercial Bar Steel.
A9–1923	Standard Specifications for Reinforcing Materials for Concrete.
C10–1923	Standard Specification for Tungsten Incandescent Lamps.
D11–1924	Interim Report on the Manufacture, Testing and Use of Gasoline.
B12–1924	Standard General Specification for Galvanized Steel Wire Strand.
E13–1924	Standard Specification for Railway Wire Fencing and Gates.
C14–1924	Standard Specification for Reinforced Concrete Poles.
C15–1924	Standard Specification for Eastern Cedar Poles.
A16–1924	Standard Specification for Steel Structures for Buildings.
C17–1925	Standard Requirements for A. C. Watthour Meters.
B18–1925	Standard Specification for Stove Bolts.
A19–1926	Standard Classification of Items of Highway Expenditure.
A20–1927	Standard Specification for Movable Bridges.
C21–1927	Standard Specification for Control Cable for Electrical Power Plant Equipment.
C22–1927	Canadian Electrical Code, Part I.

A small stock of specifications issued by the British Engineering Standards Association is on file, and specifications issued by the American Engineering Standards Committee can be readily obtained. Arrangements can also be made to obtain the publications of other standardizing bodies in Europe.

In addition to the Year Book already mentioned, the Association now publishes the Canadian Engineering Standards Association Bulletin, a quarterly pamphlet giving an account of current committee meetings, announcement and description of new publications, secretary's activities, personnel of working committees, and other items of interest. Four numbers have appeared to date and have met with a most encouraging reception. Copies of the Year Book and the Bulletin are sent to those interested free of charge.

CONCLUSION

Standardization and simplification go hand in hand, and much of the work

now being done by the Canadian Engineering Standards Association is in the nature of simplified practice, or waste elimination.

Although considerable standardization work has already been done in Canada, the work of simplification is still in its infancy, and for an organization such as the Canadian Engineering Standards Association there is presented a most fruitful field of endeavour. No material progress can be made without whole-hearted and practical coöperation on the part of industry, and it is safe to say that when industry once realizes the financial benefit to be derived, there will be no lack of coöperation on their part.

It is most encouraging to report that so many representatives of industrial firms and so many technical men have shown their willingness to voluntarily give their services in the preparation of specifications already issued by the Association, and to them a great debt of gratitude is due. It is the earnest desire of the Association to establish and maintain the most friendly relation with all industrial interests and it welcomes every opportunity of assisting in the solution of industrial problems, wherever the principles of standardization and simplification can be applied.

It is impossible to overestimate the financial benefits to be derived by those who adopt and intelligently apply the principles underlying these two great economic movements. The Canadian Engineering Standards Association therefore, is not at all diffident about offering its services, and it looks hopefully to Canadian industry for the financial support and coöperation necessary to carry on its work.

Simplification and Standardization in Europe

By Victor S. Karabasz
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THE amount of work being carried on in the fields of simplification and standardization in Europe at the present time is astonishing. This work has already attained such proportions that its beneficial effects are being felt in European industry. It has been of considerable importance in the industrial rehabilitation of Europe following the war, and at the present rate of development promises to be of much greater importance in the future.

Early Stages of Development

In the early stages of the development of simplification and standardization they were regarded only as problems of interest to the technical men in the organization; now they are beginning to be regarded as managerial problems of the greatest importance in industrial production. European industrialists are beginning to realize more than ever before the important parts which simplification and standardization must play in the manufacturing development of their countries and in their ability to compete successfully in the scramble for foreign markets. Indeed, much of the work in these fields is being done with the foreign market particularly in mind.

Widespread Interest

Simplification and standardization in Europe have become a part of the very important movement of "rationalization" of industry, a movement which promises to be of tremendous importance in the industrial development of Europe. Some conception of the importance which the world at large and European nations in particular attach to simplification and standardization can be obtained from the report of the World Economic Conference, which met in Geneva from May 4 to 23, 1927. One of the questions discussed at this conference was that of the "rationalization" of industry. "Rationalization" of industry was advocated by the conference, and with regard to it the conference had the following to say:

> The first of these problems is that of rationalization, by which we understand the methods of technique and of organization designed to secure the minimum waste of either effort or material. It includes the scientific organization of labor, standardization of both material and of products, simplification of processes and improvements in the system of transport and marketing. . . . The Conference considers that such rationalization aims simultaneously:
>
> 1. At securing the maximum efficiency of labor with the minimum of effort.
> 2. At facilitating by a reduction in the variety of patterns (where such variety offers no obvious advantage) the design, manufacture, use and replacement of standardized parts.
> 3. At avoiding waste of raw materials and power.
> 4. At simplifying the distribution of goods.
> 5. At avoiding in distribution unnecessary transport, burdensome financial charges and the useless interposition of middlemen.
>
> Its judicious and constant application is calculated to secure:
>
> 1. To the community greater stability and a higher standard in the conditions of life.
> 2. To the consumer lower prices and goods more carefully adapted to general requirements.

3. To the various classes of producers higher and steadier remuneration to be equitably distributed among them.

Another indication of the widespread European interest in simplification and standardization is found in the large number of articles published in the technical magazines as well as the recent appearance of two books on the subject. In England Cecil Chisholm has published a book entitled "Simplified Practice," in which he discusses simplification as carried on in the United States as well as the possibilities of simplified practice in British industry. In Germany, Mr. B. Birnbaum, a member of the German Merchants' Delegation to the United States, has written, "The Elimination of Waste Movement in the United States," in which he stresses the work of the Division of Simplified Practice of the United States Department of Commerce.

Although there existed before the war only one national standardizing body in Europe—the British Engineering Standards Association—no less than sixteen European countries have such bodies at the present time, and there probably is not a single country in Europe which is not in some way or other carrying on work in the field of simplification and standardization. Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Great Britain, Holland, Hungary, Italy, Norway, Poland, Russia, Sweden and Switzerland have national standardizing bodies.

Table I contains the names of the national standardizing organizations.

TABLE I

AUSTRIA. Osterreichischer Normenausschuss Für Industrie und Gewerbe (O. N. I. G.), Vienna, Austria.

BELGIUM. Association Belge de Standardisation, Brussels, Belgium.

CZECHOSLOVAKIA. Ceskoslovenska Normalisacni Spolecnost, Prague, Czechoslovakia.

DENMARK. Den danske Standardiseringskommission, Copenhagen, Denmark.

FINLAND. Finlands Standardiseringskommission, Helsingfors, Finland.

FRANCE. Association Française de Normalisation, Paris, France.

GERMANY. Deutscher Normenausschuss, Berlin, Germany.

GREAT BRITAIN. British Engineering Standards Association, London, England.

HOLLAND. Central Normalisatie Bureau, The Hague, Holland.

HUNGARY. Magyar Ipari Szabvanyosito Bizottsag, Budapest, Hungary.

ITALY. Comitato Generale per l'Unificazione nell' Industria Meccanica, Milano, Italy.

NORWAY. Norges Industriforbunds Standardiseringskontor, Oslo, Norway.

POLAND. Polski Komitet Normalizacyjny, Warsaw, Poland.

RUSSIA. Council for Labour and Defense, Standards Committee, Moscow, U. S. S. R.

SWEDEN. Svenska Industriens Standardiseringskommission, Stockholm, Sweden.

SWITZERLAND. Schweizerische Normalien-Vereinigung, Baden, Switzerland.

While all European countries having national standardization organizations are doing important and valuable work, the work of Germany and Great Britain is of outstanding importance and is worthy of considerable study.

GERMANY

Standardization work on a national scale began in Germany in May, 1917, with the organization of the Normalienausschuss für den Maschinenbau. This organization was charged with the responsibility of standardizing fundamental machine elements. The work of this organization developed so rapidly, extending itself to other industries, that in December, 1917, it was decided to change the name of the organization to Normenausschuss der Deutschen Industrie. The organiza-

tion operated under this name until November, 1926, when it was again decided that the name of the organization did not properly describe the work as it had been rapidly developing since 1917, and the name was, therefore, changed to "Deuscher Normenausschuss." This organization is now the national standardizing body of Germany.

Deutscher Normenausschuss is supported in part by an appropriation from the Reichs Kuratorium für Wirtschaftlichkeit, which is an organization supported by government grants, the purpose of which is to act as a clearing house of information of value to German industry as well as to act as the center of the Rationalization movement in Germany. Deutscher Normenausschuss is also supported by technical societies, trade associations and a large number of individual firms. In fact Deutscher Normenausschuss is a federation of technical societies, trade associations, government departments and contributing industrial firms, developing nationally recognized industrial standards.

As is the case in the development of standards in nearly all countries, the Deutscher Normenausschuss operates on a committee basis on which committees are represented, all the parties interested in the development of a given standard. The liberal representation of all the interested parties on the various working committees and the widespread publication of the tentative drafts for criticism assures adoption of the standard after it has been established by the committee.

Practically all of the large and medium-sized firms in Germany are taking an active part in the development of standards. Some of these firms have their own standardization organizations, and the profession of standardization engineer is already established and is being rapidly developed. Some consulting engineering firms specialize in standardization work, while a fair proportion of the time of others is being devoted to this work. In many concerns the use of parts or material other than the regularly established standards must be specially authorized, while others have all drawings carefully checked to see that the maximum use is being made of the established standards.

Some conception of the widespread character of the work being carried on in Germany can be obtained when one understands that in the period of ten years the Germans have developed and established more than 2100 standards, and these standards embrace nearly every branch of industry. Up to the end of 1919 the number of standards established was 24; in 1920 it had increased to 102, in 1921 to 242; in 1922 to 335; in 1923 to 571; in 1924 to 748; in 1925 to 1235; in 1926 to 1709, and in 1927 to 2129.

Important work in simplification and standardization is now being carried on in the agricultural implement, enamel ware, file, tool, aluminum, textile, leather, oil, building, varnish, ink, bicycle, brush and other industries.

In order to bring the established German standards into general use as quickly as possible, a number of important German firms, including the Allgemeine Elektricitäts Gesellschaft, the Süddeutsche Metallindustrie, the Hirsch Copper and Brass Works and others have declared that they will not charge up to buyers of standardized goods and spare parts the cost of introducing new tools for the manufacture of standard articles.

The outstanding characteristic of German standardization, in addition to the large number of standards established, is that the vast majority

of it is dimensional work with relatively less emphasis on quality specifications and tests.

GREAT BRITAIN

Simplification and standardization work in Great Britain while progressing at a slower rate of speed than in either Germany or the United States, nevertheless has made notable advances and is worthy of special notice.

The national standardizing body in Great Britain is the British Engineering Standards Association. It was established in 1901. Its budget is about $80,000 per year, and receives financial support from the British Colonies and Dominions, as well as from industry. This organization has very nearly 500 committees and subcommittees working on various phases of standardization and simplification in a great variety of industries. In this work thousands of business men and engineers contribute their services without fee.

Considerably more than 500 standard specifications have been issued up to the present time. These standards are published and sold to all interested. Over 50,000 copies of such standards are sold annually.

The procedure in the developing of programs of standardization and simplification in Great Britain is almost identical to that used in the United States, with the exception that there is no organization in Great Britain corresponding to the Division of Simplified Practice of the United States Department of Commerce to facilitate the work of simplification. This is a distinct handicap to those industries which might be classified as non-technical.

It is interesting to note the emphasis which is placed upon the foreign trade possibilities in a given program of simplification and standardization in Great Britain. An excellent example of this is found in the program of simplification of steel telegraph poles, in which the number of telegraph poles was reduced from almost an infinite variety to four. Each of the four varieties retained is different and the four varieties provide a pole for any possible variation in climate. These types, when finally issued, will not only be a standard for England but will, in reality, be Empire standards.

Another interesting feature of British standardization is that a considerable sum of money has been appropriated in order to have the existing British standards translated into foreign languages, so that they can be used by foreign purchasers and thus increase the market for British goods.

Out of a list of more than 250 standards which were in the course of preparation in 1927 by the British Engineering Standards Association, the following were chosen at random and will give some indication of the type being worked upon:

Structural Steel for Shipbuilding
Cast Iron Pipes for Water Gas and Sewage
Broken Stone for Road Purposes
Details of Locomotive Construction
Carriage and Wagon Axles
Rivets for Boilers
Twist Drills
Fire Hose Couplings
Steam Turbines
Electrical Performance of Traction Motors
Edison Screw Lampholders and Caps
Electric Cut-outs
Insulating Oils
Deck and Hatch Fittings
Grey Iron Castings
Hard Pure Aluminum Sheets for General Engineering Purposes
Brass Aluminum and Copper Rivets for Chassis
Meshes and Gauges of Screen Material
Patent Liquid Driers
Colliery Tub Wheels and Axles
Mining Hand Lamp Bulbs

FRANCE

Association Française de Normalisation, the national standardization body of France, was founded by a Presidential Decree on June 10, 1918. It is attached directly to the Ministry of Commerce and among its members are included the Departments of Commerce, War, Naval Affairs, Public Works and Labor. The Academy of Science, the Society for the Encouragement of National Industry, the Society of Civil Engineers, the Society of Electrical Engineers, the Society of Mining Engineers, as well as many other technical societies, are associated with it.

There has been, and continues to be, a considerable amount of interest in simplification and standardization. At the present time special emphasis is being placed upon its application in the automobile and automobile accessory industries. The two organizations interested in the development of standards in these industries are the French Society of Automobile Engineers and the Association of Manufacturers of Automobile Accessories. The fact that a certain manufacturer of piston rings carried no less than 3800 models, that there are at least 250 types of batteries and 60 dimensions of tires is some indication of the work ahead of these organizations.

The organizations interested in the development of standardization in France have, up to November 30, 1927, established approximately 350 standards. The Permanent Committee on Standards has adopted 50; the Union of Electricity Syndicates 40; the Technical and Industrial Department for Aviation, 60; the Association of Railway and Tramway Builders, the Union of Railways, the French Mining Committee and other organizations have adopted about 200.

CZECHOSLOVAKIA

In Czechoslovakia there exists the Czechoslovak Society for Standardization. This society was founded in 1922 by twelve leading industrial establishments, and had, at the end of 1927, sixty-nine members. Membership is limited to industrial establishments.

By the end of 1927, twenty-six Czechoslovak standards were published in book form in both Czech and in German, and sixty other standards were in the course of preparation.

As an illustration of the type of work being carried on in Czechoslovakia, it can be stated that the number of sizes of wagon wheels were reduced from 1000 to 28, and that 200 different types of frames for doors and windows have been reduced to 16 standard types.

The Masaryk Academy is a very important organization in Czechoslovakia, fostering the development of industrial management and making known to the engineering and industrial community the necessity for simplification and standardization.

ITALY

In Italy excellent work is being done by the national body, Comitato Generale per l'Unificazione nell' Industria Meccanica.

POLAND

In Poland the Polski Komitet Normalizacyjny is doing excellent work in simplification and standardization, and the results of this fine work are evident in Polish industry. The Institute of Scientific Management (Instytut Naukowej Organizacji), Warsaw, under the very able direction of Professor Adamiecki, is doing very valuable work in fostering simplification and standardization in Poland.

AUSTRIA

The Austrian standardization work is much like that of Germany. There is an active national standardizing body in Austria whose work is well worth studying.

HUNGARY

Hungary possesses a very active national body, the Hungarian Engineering Standards Committee, which was established in 1921. Some very interesting work is being carried on in connection with the development of standards relating to mining equipment and mining practice, as well as to standard classifications of coals.

NORWAY, SWEDEN AND DENMARK

Norway, Sweden and Denmark have national standardizing bodies which are actively engaged in the development of standards for their respective countries.

BELGIUM

The standardization work of Belgium probably resembles that of England more than that of any of the other continental countries.

SWITZERLAND

A very large amount of standardization work under a very active national organization is being carried on in Switzerland.

THE NETHERLANDS

The national standardizing body of the Netherlands have more than one hundred projects under way at the present time. Some of the programs being worked upon are those covering portland cement, cement lime, conduit pipes and accessories, fire service material, nuts and bolts, ball bearings, electrical machines, ship building and pulp.

SOVIET RUSSIA

A tremendous amount of interest in simplification and standardization is being shown in Soviet Russia. The Standards Committee of the Council for Labor and Defense, the national standardizing body of Soviet Russia reported on January 1, 1927, that at that time approximately 400 standards were in various stages of development. These standards are classified into fourteen main groups, namely: Fuel, Agriculture, Foodstuffs, Metals, Electrical Engineering, Chemical Industry, Textile Industry, Leather and Furs, Paper, Woodworking, Civil Engineering, Transport, Communications and General.

Russia is gathering from the United States and other countries all of the available established standards which she is using in the development of her own standardization programs. Such organizations as the Institute of Administrative Technique in Moscow, and the Institute for Scientific Management in Kazan and others, are taking an active part in educating the various interested groups in the value of simplification and standardization.

OUTSTANDING GROWTH

The growth of simplification and standardization in Europe since the war is nothing short of marvelous, not only from the standpoint of the number of standards actually established and the number in the course of preparation, but also from the standpoint of the number of industries involved and the high quality of the work being performed. This tremendous growth is in part the result of the industrial conditions in which most European countries found themselves at the end of the war; in part to the fact that simplification and standardization have become part of the important "rationalization" movement in Europe, a movement

which considers both these problems of fundamental importance in the industrial development of an individual country and of Europe generally; in part to the realization that simplification and standardization have an important bearing on foreign trade; in part to the general use by European countries of the "sectional committee" idea developed by the British in the development of standards which practically assures the utilization of the standard after it has been once adopted; and in part to the use by many European countries of such publications as the DIN Mitteilungen des Deutschen Normenausschusses, publications which keep industry informed on the progress being made in standardization throughout the country.

The two most active countries in Europe in the field of simplification and standardization are Germany and Great Britain. The work being carried on by Great Britain more nearly corresponds to that being done in the United States, while that of Germany, up to the present time, has been primarily dimensional in character. The work of the other European countries is by no means, however, to be ignored. It, together with that of Germany and Great Britain, is worthy of careful study by United States manufacturers.

The Place of Standardization in Modern Life

By Albert W. Whitney
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IT is not uncommon nowadays to see articles and editorials and letters in the public press deploring the state of uniform mediocrity that standardization will produce if allowed to have its way; this may even be considered to be a standard objection to standardization; in fact, with fine irony, a syndicated editorial on the evils of standardization has recently appeared in papers throughout the country.

That the question is receiving public attention indicates two things: First, that standardization is now generally recognized to be a matter of importance, and second, that either a real danger exists or else a popular misapprehension of what standardization aims to accomplish. In any case the situation calls for light and discussion.

Business and industry must increasingly feel an obligation to discover the social implications in what they are doing. It is not enough to justify an institution merely by its effect upon business, for business, the supplying of the material needs of the world, must look for its own justification to its effects upon society. The place of standardization must therefore be judged from this broader, more thoroughly human point of view.

The questions that must be considered are these: Is standardization a desirable and necessary process; if so, what is its exact place in the world; and second, how is it susceptible of abuse, and how can such abuse be avoided? In order to answer the first and main question it will be enlightening to realize the part that standardization has played in nature.

The Part of Standardization in Nature

The processes of nature and of men, are, after all, very much alike. The designing room of nature is continually turning out new ideas in plant and animal life. These she tries out, not on a special testing floor, but in life itself. If they are worth while, the new forms find a place for themselves and live; if they are badly designed, they die and leave no descendents and the model is discontinued.

The advance that man has made, building upon all that nature can give, lies in the ability to experiment. He does not have to wait for the slow process of mutation and for an actual trial in life itself. Thought consists essentially in the ability to try the world out in imagination. The architect's plan for a house is essentially his way of being able to live in imagination in the house, and if in this imaginary life he finds that there are no stairs to the attic and that he has an inconvenient time getting a bath, it is not necessary to tear the house to pieces in order to make the correction, but only to do some more thinking. All thought, even the most abstract, is essentially a way of imagining life.

There should be then a strong resemblance between the processes of nature and the processes of man, the difference being that nature works through the infinitely slow method of trial and error and deals with life itself while man works largely in a thought world and in the laboratory which, while one stage nearer, is still far short of being actual life. All this being so,

the part that standardization has played in nature should give us a very excellent idea of the part that standardization can play and should play in the world of human activity.

Nature, by some innate property of germ plasm, stimulated apparently by the varying conditions of the environment is perpetually creating new variations in plant and animal life. This is precisely analogous to the creative faculty in human thought. This process of nature, uncontrolled, would fill the world with endless variety. There would be not only the myriad types that we now have but innumerable modifications of those types. Natural selection, however, acting upon this variety, has had the effect not only of choosing certain types as worthy to survive but of endowing those types with a certain degree of permanence and stability and isolation. It is as though nature had not only given each type a chance to survive but had gone further and cleared out the weeds near by so as to give it the best possible opportunity to get light and air.

The effect is that nature, instead of filling the world with a continuum of plants and animals, has filled it with a discrete and actually enumerable assemblage of types, and furthermore, an ordered assemblage, each of which has a considerable degree of stability and among which certain type-conserving forces operate such as those that inhibit miscegenation.

Now this establishment of a system of discrete and enumerable types in nature is the exact analogue of standardization as a purposeful human activity, and the two are subject to the same laws and to the same abuses.

Not only has nature developed types which can be enumerated and classified, but she has standardized for each a multitude of organs and functions. Individuals of the same species resemble each other in the minutest details of structure and function. If this were not so, organized life would be practically impossible. Everything would be an individual problem with no possibility of generalizations. Institutions and customs would be impossible, for institutions and customs and laws depend upon an underlying sameness of reaction. There could be no medicine, for there would be no uniformity of physical organization or response; there could be no surgery, for the surgeon would not know whether he were cutting into a heart or a liver; there could be no organized education, because each mind would be an educational problem by itself. An underlying sameness is the basis for every civilization.

VARIETY AND INDIVIDUALITY

I do not overlook the fact that with this sameness goes along a strong flavor of variety and individuality. No two faces are exactly alike and no two temperaments and personalities are exactly alike, but this very difference, which undoubtedly gives not only much of the charm to life but which is as well the cutting edge of progress, can flourish only on a deep-lying basis of uniformity. It is the differences that persist, some of them racial but many of them cutting across racial lines, that account for the actual diversity of civilizations and institutions. Thanks be for the diversity but, still more deeply, thanks be for the sameness that makes the diversity possible and effective.

There are, then, in nature these two fundamentally different tendencies: First, a force that is continually operating to produce greater variety and, second, a force that is continually operating to eliminate unsuccessful variations and to concentrate upon relatively few types which in their main

features are reproduced faithfully from generation to generation.

VARIATION VS. STANDARDIZATION

Now, both of these processes are absolutely necessary in a world of progress and each depends intimately upon the other. Variation is creative, it pioneers the advance; standardization is conservational, it seizes the advance and establishes it as an actual concrete fact. Variation is primarily concerned with quality, standardization is primarily concerned with quantity, that is, with mass production. If the world were broken up into an innumerable number of forms with no rallying points at which nature had carried on mass production, there would be no way of expressing the fact that the successful type had been discovered. In order to make progress not only must there be a better type, but it must be made the prevailing type. If nature had no mechanism for fixing and holding the type, she would have no way of capitalizing her discoveries. Furthermore, there would be no adequate basis from which to spring in order to make the next advance. Variation is the active, creative, masculine force in evolution; standardization is the passive, brooding, conservational, feminine force out of which comes the potency of the next advance.

A SELECTIVE AND CONSERVATIONAL FORCE

When we come to the directed, purposeful evolution of human society the main lines are the same. Creation is here essentially variation from normal. Poincaré has even ventured the thought that creation, carried on as it is largely in the subconscious, may be fundamentally fortuitous, the most actively creative mind being that one which is able most quickly and most surely to run through all possible combinations of the elements of the problem and to appropriate those that have value. It is as though the mind were a shaker of dice, the most creative mind being the one that shakes the dice most eagerly and is most clever in seizing the winning combination. Standardization is here as in nature the selective and conservational force, the selection being made consciously, however, instead of through trial and error, although even in human standardization actual experiment has a large part to play.

When the type has been thus selected, economic facts fortify the selection by directing the forces of mass production upon it and it assumes a place much analogous to that of a species in the world of nature. So, just as in nature, standardization operates to capitalize the advance by making it an actually prevailing type.

EVALUATION

It is this effect that is commonly in mind when the attempt is made to evaluate the place of standardization in civilization. It is measured in terms of its effect upon mass production, it is evaluated as an instrument for making the advantages of life more abundantly available; and the critics of standardization also attack it at exactly this point, claiming that its effect is coarsening since its results are to be measured in terms of quantity rather than quality. They conceive of standardization as producing a world of universal, dull mediocrity in place of the world of color and scintillating lights and shadows and heights and depths that we have under the play of individual initiative.

While such adverse effects if produced will be largely due to the unwise use of standardization, it is also quite

necessary and pertinent to say that such criticisms completely overlook another and equally important effect of standardization that is quite wholly on the other side of the balance. I refer to the effect of standardization as liberator rather than conservator.

STANDARDIZATION AS LIBERATOR

Suppose the world of living nature really had the properties of a continuum; it would be a world of complete individualism; there would be no foci about which to group mass action, about which to gather the integrating and ameliorating forces of affection and loyalty. It would be a mad, restless, wearying world of infinite but meaningless variety and detail, obeying no laws except the laws of probability, to which even the molecules in their aimless wanderings give allegiance.

Creative work in such a world as this would be an impossibility. Nothing would stay put; there would be nothing to stand on to make a fresh advance. All one's energies would be used up in meeting the idiosyncrasies of the immediate moment. In the field of industry each piece of machinery would be an individual problem, even each screw, each bolt, and each nut. What time would be left over amid such maddening detail for fresh advances?

Standardization is thus the liberator that relegates the problems that have been already solved to their proper place, namely, to the field of routine, and leaves the creative faculties free for the problems that are still unsolved. Standardization from this point of view is thus an indispensable ally of the creative genius.

Nature has very well understood the necessities of the situation. She has not only provided the brain with which to solve new problems but she has provided the reflex nervous centers to which the brain may relegate the control of habits, which are only the clerical assistants of thoughts, so that the brain may be set free for a more primitive contact with reality. Standardization is similarly the habit-forming process in industry.

I have referred specifically to standardization as having to do with types of plants and animals and also to the industrial standardization that we are familiar with, but in passing I should call attention to the fact that standardization has a still wider scope. In a very real sense all the conservational forces of civilization are within the field of standardization, institutions, customs, laws, literature and other forms of art, science—they all involve the fixation of advances which have been made into a better understanding of the world, and such advances are in turn points from which to make fresh advances.

So far I have been concerned solely with what might be called the hygiene of standardization; that is, with evaluating the place that it should play in the world under normal conditions. This is a far easier task than to treat the pathology of standardization, that is, how it may be abused in a world that is itself more or less out of joint.

THE PATHOLOGY OF STANDARDIZATION

Standardization undoubtedly has its diseases; it would be strange if it did not. It is curious that nature itself has misused it. Nature, having discovered the type, proceeds to produce replicas in incredible numbers; the way in which babies, guinea pigs, grasshoppers, and dandelions appear in the world beats any feat of industrial mass production. And often such production of nature is quite unsuited to actual conditions or is productive of positive harm, as when a small apple tree produces so many apples that not only are they of inferior quality but

they are produced at a sacrifice to the vitality of the tree.

Standardization itself is so thoroughly fundamental and necessary a process in both nature and civilization that any evil effects must evidently be looked for not in the process itself, but in the way that it has been applied. It is probable that all abuse of standardization comes from directing it toward too limited an objective. It is either used to accomplish some immediate purpose, overlooking the larger and fuller good that might be accomplished if a longer view into the future were taken, or it is used to meet the needs not of the public as a whole, but of some particular interest. Nature, when she let the apple tree overload itself, allowed herself to be unduly concerned with the danger of the world's running out of apple trees in the next generation, overlooking not only the need of keeping the trees she already had, but the need of good apples for the present generation. She erred in this particular case by being too farsighted. We commonly err on the other side by aiming at an increase in our immediate material production, when this can be had only by the sacrifice of greater ultimate values.

SOCIAL IMPLICATIONS

At this point some consideration should be given to the social implications that are contained in the industrial standardization methods of today. In a suggestive posthumous article in the *Atlantic Monthly* several years ago, Lord Moulton commented upon the fact that law and manners and custom are only the various means that society uses to produce the degree of uniformity that is necessary as a basis for civilized life.

Custom and manners govern that part of the field in which the consequences of a departure from the established order will not be so flagrant that the situation cannot be controlled, and best controlled, through the force of public opinion. The common law covers another part of the field where an order established by long usage has finally received the sanction of the state. Statute law is a body of uniform procedure that can be enlarged quickly to meet conditions arising so suddenly that there is no time for manners and custom and common law to grow up to meet the situation.

SUSCEPTIBLE OF ABUSE

The enormous material development of the last fifty years, in which thousands of new adjustments have become necessary in fields which had never even existed before, has, however, put a load upon statute law that has proved to be unbearable. Some ten thousand or more new laws are being passed in this country each year and the courts are clogged with cases in which these laws are being interpreted.

This is not the only difficulty, however. The system of statute law is based upon the assumption that means will be found by which the laws that are made can be the product of mature deliberation by persons qualified both by knowledge and by ability and because of their representative character to decide what course of uniform procedure is in the interests of the public good. How far from this ideal is our average lawmaking of today! Our laws are in general drafted hurriedly, often or even usually by persons with very special interests at stake; they are given cursory consideration in committee by persons far from expert in the matters in question, voted upon by legislators neither representative of the interests concerned nor especially qualified to pass upon the merits of the particular measures proposed and largely influenced by political expedi-

ency. What a travesty upon the mature wisdom that is necessary in the enormously important work of establishing that basis of uniformity upon which the further progress of the race is to be built! The promise of an escape from this condition curiously enough comes not from society in general but from industry. Society with its more vital and fundamental interests is, nevertheless, extremely long-suffering. Industry's more immediate material needs are in effect more compelling, and industry has blazed a way for meeting the situation which may have far-reaching results.

REMEDY OF ABUSE

Industry was not able to depend upon legislation and the courts to make the adjustments that were necessary among the multitude of conflicting interests that required harmonization. It was driven by the exigencies of the situation to set up a machinery of its own for establishing the uniformity that was necessary for an effective carrying on of its undertakings. What was needed was a modern substitute for custom and common law, a process that would produce a thorough harmonization of interests but in a limited period of time,—kiln-dried custom so to speak.

For this purpose there were two essentials: a standard to have the same effect as custom and common law must be the product of a meeting of minds in which all interests are represented and out of which comes a genuine consensus, not the coercion of a minority by a majority.

The further we progress on the road of industrial standardization, from standardization by the individual worker to standardization by the factory, from standardization by the factory to standardization by the industry, from standardization by the industry to standardization for all industries on a national basis, the more clear does it become that standardization must be a process by which a consensus of all interests is reached in a thoroughly representative and democratic manner. Nothing else has permanent value; but when standards are prepared in this way we are made to know that we are on the right road by what has always been the sign to those that have kept the faith, a miracle.

When diverse elements are brought together, the result may be a compromise; it often is a compromise, particularly if the result is reached through the efforts of those who do not understand and who make no effort to understand, but when a body of sincere, well-meaning, understanding persons come together in the continuing presence of the truth, however diverse their interests may apparently be, a marvelous thing happens,—a solution appears which is not a compromise, but which in the majority of cases is the best for all concerned.

A standard made under these conditions has all the validity of custom and the common law itself. Having been made through a consensus of all interests concerned, it goes into effect almost automatically, for there is no one to oppose it; the problem of enforcement and administration is therefore reduced to a minimum.

The process of standardization that I have described is far more effective than the process of legislation in securing an intelligent basis of uniformity in at least two further respects: First, many standardization projects can be carried on simultaneously, for each, even though participated in by the same interests, makes use of its own particular body of experts; and, second, the very fact that the result reached is a consensus thoroughly representative of the interests involved as well as a

consensus arrived at by experts guarantees that a degree of understanding will be brought to bear upon the problem that can be had in the case of legislation only when the work is carried on by a commission.

There seems to be no valid reason why this essentially modern method of creating the equivalent of custom and common law through conference, a method which is now working so admirably over a considerable area in the industrial field, should not be extended into the broader field of social relations even though the latter problem is undoubtedly far more difficult. A consensus of all interests, arrived at through conference, seems a both reasonable and feasible substitute not only for blind competition but to a considerable extent for processes of legislation that have now proved themselves inadequate.

There can be little to fear from standards that have been made in this way. It is not the real standards that we need be afraid of. If they are right they will find a place for themselves in civilization and will only go toward building up that great wholesome, restful sameness which is the real basis not only for a democracy but for an aristocracy and the only basis upon which new growth can take place. It is the standards that do not represent a real consensus of all those interests that are concerned in progress which we should fear.

The safeguards against bringing such ill-begotten standardization into the world can only be a realization of the high and serious mission of the standardizer, and an almost religious consecration to the duty and privilege of helping to direct progress in this fundamental way.

The Economic Aspects of Standardization

By K. H. Condit
Editor, American Machinist

FROM the practical point of view there is but one criterion by which to judge a piece of industrial standardization and that is its economic justification. Much of the effort expended on standardizing in the past has been wasted because there was no economic justification for the project. The results, therefore, were not accepted by industry and the standard was not worth the paper on which it was written.

One of the factors involved in determining the economic value of a standard is its timeliness. Disregard of this factor has brought many a bit of valuable engineering standardization to grief. Take as an example one of our best instances of standardization work, the modern automobile. Today the gear-shifting arrangements on practically all cars are alike; the crankshafts all rotate in the same direction; many minor parts are interchangeable on cars of different makes but of approximately the same size. We take all this as a matter of course now, but it is only recently that it has been made possible. Consider, for a moment, what would have happened had similar standardization been attempted in 1903, only 25 years ago. The automobile then was in its early development stages. Most of the designs were experimental and were subject to radical changes each year, and sometimes oftener. Any effort to standardize then would have resulted either in failure or in a retarding of development quite as bad. Now that the art has reached a high state of advancement, annual changes are relatively minor in character, and many parts, bolts and nuts, for instance, are not affected at all. At this stage considerable standardization is not only possible but highly desirable.

Style Factor

Another factor that has a strong bearing on the economic justification of standards work is the style factor. Much of the opposition to any kind of standardization comes from generally unthinking "individualists" who view with the utmost alarm the possibility that they will be compelled by a grim-jawed, mechanically efficient standardizer to wear clothes cut to a standard pattern, made of a standard material and indistinguishable from those worn by everyone else. They fear that they will be forced to eat standardized food, drink standardized drinks and live in standardized houses. They forget that they go to work over standardized railroads, read standardized newspapers to learn what is happening in the world, and carry on their businesses with such highly standardized equipment as the telephone and the typewriter.

The distinction between what should be standardized and what should not must be made on an economic basis. As to clothes there is a definite limit. A man's coat is pretty well standardized as to general shape, arrangement of pockets and number of buttons, but not as to material or the finer points of the cutter's art. His wife's clothes, on the contrary, are apparently standard only in the distance her skirt must be from the floor. On this point the dictators of style are positive, although they revise the standard periodically. He may have a feeling when he is

presented with a bill for what seems like an inordinate number of costumes that a little standardization might be very well justified on economic grounds, but he realizes that peace of mind is also worth a lot.

At the same time, there is probably more standardization here than some of us realize. For example, one clothing maker in New York makes nothing but blue serge suits of one weight of material. There is always a market for a staple of this nature and he can therefore keep his plant working steadily and turn out a good product at a price very much below that possible for the maker who works up all kinds of goods in a variety of styles.

Here is the point overlooked by the thoughtless worrier. If the standardization he fears does not meet with general approval—if people will not buy such standardized goods—the whole attempt is a failure. It is not justified economically.

Up to this point we have discussed standardization in general terms; now we can particularize. Standardization has various stages or grades, each one of which has economic aspects peculiar to itself. The grades might be designated as international, national, industry, corporation and company.

INTERNATIONAL STANDARDIZATION

Very little has been accomplished in international standardization, for obvious reasons. The manufacturing arts are at different stages in different countries, and what is acceptable in the advanced country is not in the backward one.

Size standardization is almost impossible because of variations in measuring units. The great bulk of the manufacturing is done in Great Britain and the United States to English units, while the minor part is done in many other countries to metric units. A little progress has been made with ball bearings and screw threads.

No such serious handicap affects the standardization of test codes on an international basis. Considerable progress has been made in this direction and the machinery is set up to continue it.

Until international trade is conducted on a basis less strongly flavored with nationalism, and industrial education has made more progress than it has as yet, there will apparently be little economic justification for extensive standardization.

NATIONAL STANDARDIZATION

Coming down to the next grade, national standardization, we find fewer handicaps to be overcome. Size standardization becomes feasible by reason of standardization of the system of measures in each country. The various industries in any particular country are more nearly abreast of each other in their respective states of development, but there is still much to be desired in this direction.

Economic justification of standards work in a given country depends on the public acceptance of the work of the various organizations engaged in standardizing, and this again depends on the extent to which the general public is ready to discard tradition and accept innovation. Education and persuasion must be employed to encourage adoption of any type of standard because there is no satisfactory means of enforcing adoption. The emphasis here is on the word "satisfactory" because legislation can be employed as a means. That it is not universally satisfactory as a medium is clear from the difficulties encountered in enforcing prohibition legislation, an unpopular enactment.

What success in national standardization has been achieved in this country, and it is considerable, has been the

result of a gathering of those interested, under the direction of an impartial chairman, at which concessions were made and a general agreement was reached. Those concerned in such a meeting had a mutual interest in the undertaking and were seeking the same objective. It should be said that the standards so arrived at have been of little moment to the consumer except to reduce the cost to him of the product standardized. Because he suffered no inconvenience and has enjoyed an improvement in quality of product or a decrease in price, he has been willing to accept such standards and so assure their economic justification.

INDUSTRIAL STANDARDIZATION

Stepping now into the wider circle of industry standardization we find a smaller group of interested individuals or organizations and a correspondingly simpler task of reconciling differences. Under present conditions the trade association is the medium through which such standardization is generally accomplished. Projects not subject to national standardization because of the disaffection of certain groups or industries are readily handled in the other groups as individual actions. The result is not the perfect one that might come from a national movement but it is a step in the right direction and represents a saving for some part, at least, to industry and the consuming public.

Industry standardization sometimes fails because two or three reactionary companies or individuals refuse to come along with the majority. In that case it is perfectly possible for a large corporation in the industry to carry on its own standardization work. Perhaps the most notable example is the General Motors Corporation. It has an efficient standards committee and can point with pride to its accomplishments. Although it is extremely difficult to show savings due to standardization in dollars and cents, the tremendous profits of the corporation are attributable, in some part at least, to savings resulting from standardization.

Even in this type of standards work there are differences of opinion to be ironed out. There are many companies in the General Motors organization, and some of the individuals involved have had to be talked into acceptance of the corporation standards.

If all else fails, the individual company can always do standardizing within itself that will be economically justified on its balance sheet. There is a New England manufacturer of thread who endeavored unsuccessfully for three years to get his competitors together on a simplification project that would have saved all of them much money. At last, in disgust, he gave it up and attacked his own list of types and sizes, cutting out the small sellers ruthlessly. At present he is the only manufacturer in the group that is operating profitably. Clearly there is economic justification for this kind of standardization.

In the discussion of international standardization two kinds of standards were mentioned, test code or procedure standardization, and dimensional standardization. There is a third, quality standardization. What, briefly, are the economic aspects of these three types of standards?

QUALITY STANDARDIZATION

When we buy a boiler built to pass the tests prescribed in the Boiler Test Code we know what pressure it will stand and what to expect from it. Similarly, when we buy an electric motor we know it will stand certain conditions of service satisfactorily or we can return it. A building must comply with the local building code, from which we are certain what loads

it will carry. Buying under these conditions we are relieved from the expense of testing the product or structure for ourselves. It is safe for our men to work with, near, or in such products or structures. We are saved certain expenses that we should have to meet were the items not built according to standard code.

Quality specifications are well established and economically essential to industry. In certain cases materials are bought on the trade name only, largely because the manufacturer has built up so high a reputation for quality that checking him up has been found unnecessary. The trend, however, is toward purchase to a rigid specification to be sure that variations in materials will not upset the fine balance of operations in the modern manufacturing plant. Part of the economic justification lies in the freedom from disorganizing uncertainty. A larger part lies in the ability to purchase a standard material in larger quantities.

DIMENSIONAL STANDARDIZATION

Dimensional standards have been reduced to exceedingly close limits of recent years. Accuracy of manufacture that would have been prohibitively expensive not long ago is common practice now and has been made possible, to a large extent, by the large demand for a uniform product, thus permitting the employment of expensive special machinery. Interchangeable manufacture is founded on dimensional standardization, and is the keystone in the arch of modern industrial production. Its economic justification is obvious.

ECONOMIC STANDARDIZATION

In conclusion let us consider one other economic aspect of standardization. Any form of standard that is so rigid as to resist revision and improvement successfully is not economically sound. Such a standard deserves every bit of the suspicion with which standards in general are viewed by some people. A standard must represent the best that industry has to offer and it must persist as a standard only until something better has been proved feasible. Then it must yield its place to the improvement.

Standards that cannot readily be revised will be dealt with harshly by economic laws. They had better not have been established in the first place because their fall is likely to pull down useful structures along with them. Evidently, therefore, the economic aspect of an industrial standard is the critical one in its existence.

The Effect on Labor of the New Standardization Programs of American Industry

By William Green
President, American Federation of Labor

STANDARDIZATION is an outstanding characteristic of the present age. Standardization sets up fixed procedures or patterns as a substitute for individual discretion or fancy. Since individuals and products increasingly conform to such standard practices, they may move or be moved from place to place and fit into local activities and be used with the maximum of ease and the minimum of waste. In the industrial field programs of standardization serve to eliminate waste and to establish definite bases for contracts. Labor benefits through whatever makes for more economical production because less of the income of industry is spent in liquidating losses.

There are two main divisions in our industrial standardization program: one, industry wide, known as simplified practices, is an agreement by the members of the trade association for industry to limit production to types and styles agreed upon; and the other is the standardization of production process within a plant, known as mass production.

The Key to Mass Production

Standardization is the key to mass production which begins with standardized design and assumes standardization of all of the parts so that they may be assembled and fitted together into a completed product. Standardization means that workers instead of making complete products, make only a part and repeat that process continually. Usually a machine handles the material and the worker operates the machine. This standardization of process increases output and decreases unit costs of production.

Large scale production, even if it is not mass production, finds it necessary to have central control and many of the methods of standardization. Standardization and mass production have revolutionized industry which had prided itself in the hand-craft skills. The older industries turned out the products each of which was the work of individuals. Present day industry turns out the products which are the work of groups. Skill in using a machine replaces hand manipulation skill. Group unity in the whole process of production takes the place of individual resourcefulness.

These standardization developments have brought about for Labor the following fundamental problems:

1. How to meet displacement of workers because of increased productivity or because of seasonal fluctuations in demand.
2. How to keep workers' purchasing power growing in proportion to increased productivity.
3. How to develop vocational education methods to meet new industrial conditions.

Mass production and standardized practices developed at a time when management was recognized as a functional element in production. Management had been learning the value of utilizing the human element in production. The more experienced

and wiser managements realized the value of experienced work groups and planned for stabilized or standardized work forces.

LABOR DIFFICULTIES

However, despite efforts to stabilize work groups and because of increased efficiency in production, we find ourselves today with a serious unemployment problem. There has been a steady decline in the number of employees in manufacturing industries since 1919. Just what has been the industrial fate of these workers we have no records to tell us. Increasing use of power machinery and standardization of production have contributed to increased productivity. Fewer workers produce greater output. Since industry has increased its productivity, unless management can sell correspondingly increasing output, either fewer workers will be needed or all members of the work force must work fewer hours.

It is clear that if through increased productivity per man hour the production per man hour doubles, and if at the same time production during the day increases by only fifty per cent, that less hours of work are necessary to produce the daily output. As experience of the last years teaches the development is as follows: Instead of decreasing the number of hours per day the manufacturer either does not change the number of hours or even lengthens the working day and dismisses all superfluous workers. We find that as far as experience goes concerning hours of work and employment, the new standardization programs resulting in increasing production with smaller production costs per unit, have worked against Labor but it is by no means necessary that they work against labor. Therefore, labor is not opposed to them but realizes their dangers and urges study of them.

New standardization programs which have resulted in increased production with smaller production costs per unit, have brought serious problems and hardships for labor. Labor recognizes that standardization or any other efficiency practices need not work a hardship on labor. As we recognize that the fault lies with the application of method and not the method itself, we do not oppose standardization but seek the corrections for faulty procedure.

SEASONAL FLUCTUATIONS

Quite apart from the employment difficulties due to technical changes is the program of standardizing the working force. Employers begin to realize how wasteful and costly seasonal fluctuations in production resulting in seasonal fluctuations of unemployment are. The number of workers employed fluctuates continuously and so does the composition and quality of the working force. In the dull seasons workers are dismissed, often very skilled men, and in the boom seasons more and more workers are employed often regardless of their efficiency and skill because of dire need of them to fill the orders pouring in. In many establishments and in quite a few industries manufacturers, therefore, try to eliminate these seasons and try to distribute production more evenly over the year as a whole. In doing this they provide work for a "standard force" of workers, skilled men experienced in their jobs. Employment becomes stable. At the same time they try to keep up not only the number of workers, not only the skill, but try to keep the same workers. They try to diminish labor turn-over. For, labor turn-over is expensive. Even the most skilled worker cannot

work with the greatest efficiency if he is not accustomed to specific working conditions of the individual establishment.

The workers dismissed from industries where standardization and other efficiencies have increased productivity, may have gone into other industries, or entered new industries, or they may have been added to the groups of unemployed. The Federation knows from its reports of unemployed trade unionists that there are many unemployed. We learn from relief agencies that requests for aid have grown in number.

The workers today present striking contrasts. Many who are fortunate enough to keep their jobs have higher wages and higher living conditions than the workers in any other country. On the other hand, the number of unemployed has risen.

WAGE STANDARDS

A second major problem which Labor finds in mass production is to keep the incomes of wage earners increasing sufficiently so that they may share in the increasing number of commodities for sale and keep pace with higher standards of living and national progress. Not only does Labor find social reasons for seeking to increase its income but there are urgent industrial reasons. If purchasing demand does not keep pace with increased output, the products remain unsold on the market and depression sweeps back to the factories. With depression production plans are curtailed, fewer people are employed, and the number of persons who could maintain their usual buying capacity today is definitely smaller.

Organized labor realizes that the greater mass of products at cheaper prices due to standardization of industry are a general benefit and the harmful consequences to Labor and the community are unnecessary if enlightened policies are followed. The American Federation of Labor, therefore, does not oppose mass production but asks management and unions to eliminate any undesirable consequences of standardization.

To help in meeting the social and industrial problem of adequate increases in wage earners' incomes to enable them to share in national well-being, organized labor has written into its official declarations a statement on wages which provides three measuring rods for wages—higher money wages—higher real wages—and higher social wages. High wage standards are an essential factor in American well-being. Incomes of purchasers must keep pace with progress in production technique. Our studies of wages show that wage increases have not kept pace with output.

VOCATIONAL EDUCATION METHODS

Our third problem, that of vocational education methods adapted to the new industry, is one upon which little progress has been made. Old apprenticeship training is not applicable for workers in mass production. Job training is the customary substitute, but there has been no educational training that provides the unity of understanding between the separate processes necessary to the completed product.

There are, of course, in mass production industries craftsmen who have this sense of unity from their training for the hand industries where they finished their products, but there are many new workers coming into the industry who have not this background. In order to have in industry this opportunity for all workers to use their intelligence, they must be educated to an understanding of the production process as a whole and to share in

directing policies which affect their daily work. Under these circumstances they may increase their value to the industry and may keep on developing mentally through the problems of their daily work.

Standardization programs which bring great benefit to workers are the safety codes for industries. These codes presuppose certain uniformities in working conditions and standardization of machinery. The codes themselves tend to standardize procedures and working conditions and to promote better conditions. However, here as always, we must be on guard not to let standardized practice dull observation and discourage investigation. Our first records of industrial accidents were related to production. When mass production first made big increases in production, we saw accident rates based on production declining and congratulated ourselves on the safety programs. However, when keener observation noted that more accidents were occurring upon a basis of the number of hours spent in industry, we got a new grasp of the safety problem and turned to a new standard.

BENEFITS OF STANDARDIZATION

Like most human mechanisms standardization contributes to progress when employed under a control which takes into consideration the welfare of all groups concerned, but may tend toward stagnation when applied automatically without critical observation.

To sum up: Standardization practices have brought definite benefits in the form of higher standards of living. Standardization of products and subsequent lower costs, and standardized methods of deferred payments, known as installment buying, have made it possible for working people to enjoy many things and to make investments that would otherwise have been quite beyond their incomes.

On the other hand, increased productivity and output have been accompanied by rising unemployment, inadequate wage increases, new problems in industrial education, new problems in workers' organizations, new problems in employment stabilization. Those problems must be dealt with constructively if we would avert industrial depression and social unrest. New standards for industrial relations are necessary and the workers must have a voice in deciding upon them. Labor believes that difficulties can be adjusted and that standardization may be wisely directed to avoid minimizing Labor's share in industrial and cultural progress.

Standardization

By MATTHEW WOLL
Vice-President, American Federation of Labor; President, International Photo-Engravers' Union

PERHAPS it may be safe to say that labor favors standardization where standardization does not restrict or standardize human life, but the more deeply the problem is analyzed the more difficult it becomes to make any sort of dogmatic statement.

The reason for this is that our whole industrial fabric is in a state of constant change, growth and development, and no man can be quite sure of where we are going. The best any sincere man or group can do is to seek as far as possible to safeguard human interests in this era of stupendous development.

There are men who worship standardization today with an almost idolatrous fervor. I think they stand an excellent chance of waking up, perhaps day after tomorrow morning, to find most of their creed washed out in a tidal wave of change. Their materials will have given way to something new and they will have to plunge into uncharted realms once more.

I know very well that in a great many circles the man who does not enter with a neatly arranged plan, with a set of doctrines, with a rounded and sonorous formula, and with assurance about everything, is set down as something of an old fogey, perhaps reactionary, certainly not of the elect who are "doing things" and providing guidance for the race. I must assume the risk. I have no formula. I know of none in our labor movement. But let me hasten to say that the labor movement offers to our wage-earning masses the only protection there is against those who have the formula for so many things and who seek so avidly to force it down the throats of everyone else.

GROWTH OF STANDARDIZATION

Standardization has made great strides in the last few years. The war compelled standardization in many fields, because the war made strict economies necessary in fields where such economies had not been necessary before. We have standardization in materials, in methods and in processes, in styles and in performance. We have come to have certain standard sizes for certain things, and the list of such things has grown amazingly. In some fields standardization avoids endless and wasteful confusion as, for example, in the small matter of electric fixture connections and plugs. But in other fields standardization would rob life of its artistic effects and of its individuality of taste.

To set up standardization as a fetish, as any sort of a great remedy for any considerable group of human problems or woes, is just so much foolishness. Let us have sense enough to take our standardization or let it alone.

The earlier efficiency or stop watch systems were efforts at standardization, seeking to create a standard workman, each of whom should do so much per hour by following prescribed movements. The labor movement fought against the villainy with such a vigor and determination as it has shown in few struggles. Today there are precious few efficiency engineers who have not joined the labor movement in condemnation of that early miscalled efficiency which at the time was offered to us as something of gospel purity which only the lazy and ignorant would refuse to accept.

APPROVALS AND OBJECTIONS

We approve standardization where it seeks to make toil easier, where it aims to conserve materials, where it simplifies the mechanics of life. But we object to standardization where it seems to rob life of its diversity, to take away its beauty, to infringe upon its freedom.

Let me admit freely that the best we can do is to use our judgment as problems come. We may be wrong more than once, but so may others. In an age when an industry may be wiped out by an invention that comes to us over night there is in regard to many of our gravest problems no time for more than an almost casual consideration. The ball cannot be pitched over again. That is the speed of social change. We have just been informed of the creation of a machine that obeys a command given over a telephone and that performs work in response to such commands. Only today, as I write, the newspapers exclaim over the invention of a motor that takes its energy from earth or air, or both. It may not work as a practical thing, but Mr. Televox does work, and other things almost as revolutionary are happening every week.

I cite these things merely by way of prelude to my thought that it is well to set store by standardization in so far as it seems to serve human needs in the broadest sense, but it is also well to beware that we do not tie ourselves fast to something that, in the swiftness of things, may not be left far arrears by tomorrow. We go too fast to say of anything today, "this settles it."

CONCLUSION

What humanity can do and ought to do—and probably in the main is doing—is to seek to work out that which is best in every way, but to be ready for change where material things are concerned. The one place where standardization can be constant is in human relations, in human conduct. There are rules of conduct—standardized rules of behavior, one towards another—that have had no corners clipped from them in at least two thousand years. It is a poor thing if there is a standardization that saves much labor and material in the making of coffins, if at the same time there is a violation of these long standardized rules of fair human conduct in the treatment of the workmen by those in whose factories these standardized coffins are made. To keep life free is the great thing. To give life its chance at diversity is also the thing. There is a certain tendency toward standardization in the schools about which I have grave fears. There are, too, many persons who almost assume to usurp the place of Deity and to say, "All children and all men and women should be thus and so," and this I do not like. Standardization has its places and its uses. So has everything, even adversity and even the right of the common run of us to be fools and roamers and dreamers, if so the spirit moves.

Let us use standardization as a tool; let us not allow it to become a master.

The Work in the Field of Standardization of the American Society for Testing Materials

By C. L. Warwick
Secretary-Treasurer, American Society for Testing Materials

THE American Society for Testing Materials had its beginnings in 1898, when there was formed in Philadelphia an American Section of the International Association for Testing Materials, which had been organized in 1895 as a result of informal meetings of various European workers in experimental engineering that had been going on for fifteen years. It was soon realized by the American members that an independent organization could best carry out the objects that were in view, and in 1902 the members of the American Section brought about the incorporation of the American Society for Testing Materials, declaring its objects to be: "The Promotion of Knowledge of the Materials of Engineering and the Standardization of Specifications and Methods of Testing."

The Society Today

The Society today is a national technical society of 4200 members, including some 400 in foreign countries. The membership is drawn from all of the important industries of the country and includes: (1) Producers of raw materials, semi-finished and finished products in the metals, cement and ceramics, paints and oils, petroleum products, timber, coal and coke, rubber, textiles and other fields; (2) such major groups of users of materials and products as railroads and allied interests, shipping industry, automotive industry, electrical manufacturing industry, public utilities, construction and building interests, and federal, state and muncipal governments; and finally, (3) the so-called "general interest" group, including consulting engineers, testing experts, educators, and technologists and scientists affiliated with government departments and technical schools.

Membership is held by individuals, companies, firms, corporations, industrial associations, testing laboratories, federal, state and municipal departments, universities and technical schools, technical societies and libraries. There are about 1150 company, firm, corporation and industrial association members, and 2750 individual members, the majority of the latter having affiliations with the various groups that have been named.

The purposes of the Society are carried out broadly in two ways. The "promotion of knowledge of materials of engineering" is effected through investigations into the properties of materials by committees and members of the Society, and by joint researches with other groups, the results of which are presented at annual meetings as reports and papers which are discussed and published in Proceedings (about 1800 pages annually). The "standardization of specifications and methods of testing" is carried on through representative committees as described later.

The major sources of income of the Society are the dues of its members and the sales of its publications, the ratio between these two being approximately 3 to 1. In 1927 the Society's income was about $108,000. Approximately

50 per cent of the annual income is spent directly in the development and promulgation of standards, the remainder being expended for activities in the promotion of knowledge of engineering materials, including publication of technical reports and papers, and for administrative and promotional work. The entire income is applied directly to these purposes; the traveling and other expenses of committee members (of which there are about 1450), and the cost of investigations carried on by the committees, are borne by the members themselves—in other words, for the most part by the industries that are participating in this work. These indirect annual contributions to the work of the Society are approximately three times as great as the actual income of the Society.

STANDARDIZATION WORK OF THE SOCIETY

The standardization work comprises in general: (1) the development of methods of testing materials, (2) the setting up of standard definitions and systems of nomenclature, (3) the formulation of specifications defining the quality and tests of materials and products, and (4) the preparation of recommended practices governing certain processes in the utilization of materials. The actual work of developing standards is assigned to standing committees, which function under carefully prescribed rules. These committees are authorized also to conduct studies and research in the field of materials, whether or not such studies may be in any way related to standardization. Their reports are made annually to the Society, which has the final responsibility for the standards

BASIC PRINCIPLES

With the great complexity of our industries, the producer and consumer of materials have become rather definitely separated in the industrial scheme. In general, the consumer buys a finished material or product, made ready-to-hand by arts upon which he can exert no direct influence. The manufacture of these materials and products has become highly intricate and specialized; quantity production and economic considerations require relatively fixed processes, subject only to gradual modification and not to be varied at the option of the user. The consumer cannot be fully informed of the processes of manufacture and their influence upon the properties of the materials he uses, while the producer is not familiar in detail with the problems that arise in the many and varied uses to which his material is put. However, only those standards for materials that are satisfactory to these two parties at interest can ever come into general commercial use. Accordingly, the Society from the beginning adopted the principle that the producer and consumer of materials must be brought together upon an equal footing in committees that are to develop commercial standards for materials, and all such committees are made up on the basis of adequate representation from these two groups and from a third or "general interest" group, comprising independent authorities who have expert knowledge of the materials to be studied but who are not concerned directly with either their production or use. The "producer" group may not predominate on any committee.

A second basic principle is that standards shall be founded upon as accurate knowledge as possible of the properties of materials and upon suitable tests for determining such properties. Finally, it is a third principle that every opportunity shall be afforded for all interests fully to express their views, both in committees and before

the Society, to present data bearing upon standards in course of development, and in every way to participate in the decisions that lead to standards. This is insured through the procedure that now governs committee and Society action on standards.

PROCEDURE

The steps in the development of a materials standard may be outlined briefly:

1. It is first necessary to agree upon acceptable methods of determining the various properties of the material This usually involves a large number of comparative tests by various methods.

2. There should be agreement as to accepted definitions of terms relating to the particular group of materials, products and processes involved.

3. The committee then discusses requirements of proposed specifications. Here full account must be taken of the influence of manufacturing processes, the nature of stresses and other conditions to which the material will be subjected in service, and the particular properties of the material that enable it to give satisfactory service. Painstaking investigation and study of experience accumulated over years of service are often required before an adequate specification can be prepared. The committee must come to agreement upon the properties of the material to be specified, the methods of test, such details of manufacture as may be necessary, methods of inspection and of marking, and so on. In all of these things it seeks to follow the best commercial practice that has been developed in supplying the particular material or commodity to the trade. Specifications for materials upon whose strength and reliability the safety of human life may depend must be especially carefully drawn and provided with adequate safeguards in testing and inspection. At times a compromise between the somewhat extreme views that may be held by producer and consumer is necessary in reaching at least a tentative agreement upon certain details, although the more clearly the problems involved are understood and the more complete are the technical data that can be presented on the subject, the more easily can a logical, rational agreement be reached.

4. After full consideration at meetings and final action by "letter ballot" of the entire committee, the proposed standard is presented to the Society for discussion and is published for at least a year as "tentative." In that status it is, so to speak, on trial by industry, where either its suitability will be established or desirable modifications indicated.

5. When a "tentative" standard either has been found acceptable or has been suitably revised by appropriate committee action, it may be proposed to the Society at an annual meeting for adoption as "standard," which requires a "letter ballot" vote of the Society membership.

6. Revisions of standards may be considered at any time, since the committees are continuing committees responsible to the Society for the standards they have formulated. The procedure for revisions is substantially the same as for new standards.

It is recognized that occasional revisions in quality standards for materials are necessary to keep abreast of improvements in manufacturing processes, changes in design and construction, development of new materials, or for other reasons. A policy that has worked well has been to make it possible to revise tentative standards annually, but standards only once in three years.

COMMITTEE ORGANIZATION

Under this procedure, the Society has organized and now maintains 45 standing committees, upon which about 1450 individuals, companies, laboratories, etc., are serving. (The aggregate membership, including duplications, is over 2000.) These committees cover a wide range of engineering materials. Many of them cover so large and diversified a field that extensive sub-committee organization is necessary; there are approximately 300 such sub-committees. Certain committee work undertaken in coöperation with other bodies is referred to later.

Attention is directed especially to the fact that many of the memberships on these committees are held by industrial firms, companies, corporations and associations representing the production and consumption of materials, who appoint official representatives to attend meetings and in other ways to assist in the work of the committees. The industries of the country are therefore participating actively, directly and in a responsible way in the development of materials standards through the instrumentality of the Society.

SUPPORT GIVEN SOCIETY WORK

Support of American Society for Testing Materials standardization work by industry manifests itself in various ways:

1. The support of and carrying on of research to further our knowledge of materials and to bring into existence the data that necessarily underlie the development of standards. This usually takes the form of contributions of material, laboratory facilities, time of laboratory men, technical supervision, and at times direct financial contributions.
2. The contribution to the committee work of information and experience obtained in the actual production and use of materials.
3. The contribution of time and traveling expenses of committee members which, considering the magnitude of the field of materials and the extent of the committee organization, is unquestionably a very considerable sum.
4. The actual use of A. S. T. M. standards and the promulgation through purchase of standards, reprinting, incorporation in general industrial standards and the like.

In summary, it will be seen that the Society, with the help of industry, the government and educational institutions, is providing a forum for the discussion of materials and the development of equitable standards, and has at hand the complete "machinery" required to develop such standards from their first inception through all the stages of investigation and discussion to their final promulgation in industry.

WHAT HAS THE AMERICAN SOCIETY FOR TESTING MATERIALS ACCOMPLISHED IN MATERIALS STANDARDIZATION?

The answer to this question is the 515 standard and tentative specifications, methods of test and groups of definitions relating to materials that the Society has developed. These are published in two volumes: Book of A. S. T. M. Standards (1850 pages) and Book of A. S. T. M. Tentative Standards (900 pages), a total of over 2750 pages of technical standards. A condensed list of materials and products covered in these standards is given below:

Steel Rails and Track Accessories
Structural Steel
Spring Steel and Springs
Reinforcement Bars and Wire
Steel Blooms, Forgings and Axles
Steel Wheels and Tires
Steel Castings
Steel and Iron Tubes and Pipe
Automobile Steels
Boiler Steels

Bar Steels
Tool Steel
Iron and Steel Chain
Magnetic Properties of Iron and Steel
Chemical Analysis of Steel
Heat Treatment of Steel Objects
Wrought Iron
Pig Iron
Cast-Iron Pipe
Cast-Iron Wheels
Malleable and Gray-Iron Castings
Chemical Analysis of Pig and Cast Iron
Ferro-Alloys
Ingot Copper
Spelter, Lead, Nickel, Aluminum Alloys
Brass and Bronze
Solder and Babbitt Metals
Copper and Brass Plates, Pipe, Rods
Condenser Tubes
Wire and Cables
Screen Wire Cloth
Chemical Analysis of Non-Ferrous Alloys
Metallographic Testing
Cement, Brick, Sewer Pipe, Drain Tile
Lime and Gypsum
Hollow Building Tile
Refractories
Concrete Aggregates
Reinforced Concrete
Paints and Oils
Shellac
Pigments
Analysis of Pigments
Petroleum Products and Lubricants
Road Materials
Coal and Coke
Timber and Timber Preservatives
Shipping Containers
Waterproofing Materials
Rubber Products
Insulating Materials
Textile Materials

Mention may appropriately be made of the following materials for which specifications and tests are in course of development today:

Various metals and metallic products for service at high temperatures
High-tensile steel forgings
Marine boiler steel
Zinc-coated sheets, wires, pipe and other products
Non-ferrous refrigerator tubing, sheet nickel, strip zinc, bronze and other castings, aluminum light-casting alloys
Metallic materials for electrical heating
Brick, hollow tile and other types of building units
Refractories
Paint pigments, shellac, varnish and linseed oil
Naval stores
Tests of petroleum products
Forms of specifications for domestic fuel oil
Road materials
Bituminous waterproofing and roofing materials
Grading rules for structural timber
Tests for electrical insulating materials
Performance tests for rubber products
Slate and building stone
Test methods and tolerances for cotton fabrics, rayon, textile goods used in the electrical industry, woolen and knit goods and cords

The standards of the Society are widely disseminated throughout the industries both in this country and abroad. The Books of Standards and Tentative Standards are customarily printed in editions, respectively, of 6000 and 2000 copies and are distributed to the members and through sales. Upwards of 50,000 reprints of the separate standards are sold annually.

COÖPERATIVE RELATIONS

The subject of tests and specifications for materials lies across, so to speak, the entire field of engineering and touches all the major industries, so that the Society has necessarily been closely in touch with many organizations working in the industrial and engineering fields. It has been the policy of the Society to coöperate with those organizations that were interested in the development of materials standards, and for many years such coöperative relations have been maintained with the leading engineering societies of the country, with government departments and bureaus, with technical associations in the various industries, and with industrial and trade associations.

This coöperative work takes several forms:

1. In the carrying out of research and investigations of materials,

the government laboratories in particular have been most helpful. Among these are the Bureau of Standards, Bureau of Mines, Bureau of Public Roads, Bureau of Chemistry, the Forest Service, Naval Engineering Experiment Station and Watertown Arsenal.

2. The coöperating organizations have become affiliated with the Society, either officially as a group or unofficially through individual memberships; they appoint representatives to serve upon the committees and thus participate directly in the development of standards in which they are interested. The policy has been maintained of placing representatives of government departments and technical societies upon committees irrespective of actual membership in the Society.

3. Joint committees are formed upon which various interested groups appoint representatives; such committees report to their parent societies and very generally succeed in bringing about concerted action among the coöperating groups.

4. An adaptation of the preceding method is being developed through the formation of "Sectional Committees" under the procedure of the American Engineering Standards Committee (see below).

INDUSTRIAL AND TRADE ASSOCIATIONS.

It is well known that there has been in the past ten or fifteen years a marked increase in the number of industrial and trade associations that have been formed by various industries for consideration of matters of mutual interest to the members of those industries. These industrial and trade associations are able to speak for their industries to a degree that was not possible in most industries ten years ago. This has had a noticeable effect upon the committee work of the Society, in that these associations serve to concentrate thought of their industries on given problems, to stimulate investigations of properties of materials in which they are interested, to bring about more readily a consensus of opinion on technical matters, and in general to accelerate standardization along many lines, including that of tests and specifications for materials. As these associations have turned to the study of materials problems, the need for close coöperation between them and the Society has been realized. The Society has kept pace with this development. These associations have been encouraged to become affiliated with the Society and to work out their materials standardization problems in coöperation with other groups through the committees of the Society, upon which they are given representation.

There are 67 technical, industrial, and trade associations in this country that are members of the Society, and of these 55 are represented either directly or indirectly upon committees of the Society. There are 53 technical societies and industrial and trade associations, not members of the Society, that are represented upon committees of the Society, upon joint committees with the Society or upon American Engineering Standards Committee "Sectional Committees" for which the Society is a sponsor.

DEVELOPMENT OF AMERICAN ENGINEERING STANDARDS COMMITTEE AS MEANS FOR COÖRDINATION

The need for establishing suitable means whereby the technical societies, government agencies, and the industrial and trade associations could better coöperate with one another in the formulation of engineering and industrial standards, and avoid duplication of standardization work and the promulgation of conflicting standards, was one of the principal factors that led to the formation of the American Engineering

Standards Committee in 1918 by five national engineering societies, of which the American Society for Testing Materials was one.

The Society's activities are being coördinated with the procedure that has been established through the American Engineering Standards Committee for correlation of standardization activities. Several committees of the Society have been or are being enlarged in scope and personnel, principally by the addition of officially appointed representatives of organizations that heretofore have not been represented, so as to function as "sectional committees" under American Engineering Standards Committee procedure, whereby the standards of the Society as they are developed may normally be cleared through the American Engineering Standards Committee as American Standards. This has resulted in still closer coöperation between the American Society for Testing Materials and other interested bodies, extending the review of materials standards by the industries of the country and facilitating their more general adoption and use. Some 45 American Society for Testing Materials standards, selected primarily because of their general acceptance in industry, have so far been cleared through American Engineering Standards Committee procedure.

The Society has also undertaken the sponsorship under American Engineering Standards Committee procedure,—in some cases jointly with other organizations,—of a number of standardization projects in the field of materials for which it has organized "sectional committees" that function substantially in the same way as its own committees, and whose reports and recommendations will be received, acted upon and published by the Society in accordance with its present policies. The principal projects of this kind are:

Zinc and Zinc Ores
Zinc Coatings of Iron and Steel
Cast-Iron Pipe
Iron and Steel Pipe and Tubing
Copper Wire
Cement
Drain Tile
Fire Tests of Materials and Construction
Methods of Testing Petroleum and Lubricants
Methods of Testing Road Materials
Rubber-Lined Fire Hose
Methods of Testing Wood
Classification of Coal

In addition, the Society is coöperating in sixteen American Engineering Standards Committee projects under the sponsorship of other organizations.

INTERNATIONAL ASPECTS

There has recently been considerable discussion of the formulation of international standards. The Society is in sympathy with the endeavors that are being made at the present time looking towards more intimate relations between national bodies throughout the world dealing with technical problems including standardization, and has declared its willingness to coöperate in such international efforts within the scope of its work.

The Society has taken a responsible part in various discussions of international standards. It has been represented for some years in the activities of the International Electrotechnical Commission. The recent reorganization of the New International Association for the Testing of Materials (replacing a former association that was dissolved as a result of the World War), in which the American Society for Testing Materials has represented American interests in the materials field, affords a worth-while opportunity for international consideration of the properties and tests of materials.

PROMOTION OF KNOWLEDGE OF MATERIALS

A description of the standardization activities of the American Society for Testing Materials would be incomplete without some reference to its important function of advancing the knowledge of engineering materials. This work, which is fundamentally fully as important as the work of standardization, is carried on through investigations and researches by committees of the Society and the presentation and discussion at meetings of papers on properties and tests of materials. These reports and papers are published annually. Among typical recent studies of this kind may be mentioned: resistance of various metals to corrosion; effect of sulphur and phosphorus in steel; properties of metals at elevated temperatures; fatigue of metals; magnetic properties of steel; value of various types of preservative coatings, including paints and metallic coatings; the properties of cement and concrete and of such products as brick, sewer pipe and tile.

The importance of extending and amplifying knowledge of engineering materials cannot be emphasized too strongly, for upon the efficient, economic use of materials depends in no small measure the progress of our civilization. It is likewise obvious that this knowledge of materials underlies all basic specification work, for the more complete our knowledge the more clearly can specifications be written and the more valuable will be the standards that are set up.

USE OF STANDARDS

The Society cannot, of course, enforce adoption of its standards. Their use in industry must therefore rest upon their merits and upon the fact that the very way in which they have been formulated, jointly by producer and consumer, has presumably brought into existence a fair equitable standard that can be readily introduced into industry to the advantage of both buyer and seller. The methods of test must be scientifically and technically sound and accurate, and at the same time practicable. The specifications must form an adequate basis both technically and commercially for the exchange of materials between producer and user.

HOW ARE THE STANDARDS USED?

Following are various ways in which the standards of the Society are used:

1. They are used without modification, as published by the Society, or as reprinted by various parties who have adopted them in their practice.

2. They are used by reference. For example, contracts will require material to conform to certain A. S. T. M. specifications or to be tested in accordance with A. S. T. M. methods, giving them by title; or the A. S. T. M. standard may be abstracted or quoted in full as a part of such contracts. The specifications of individuals, companies, governmental agencies and associations likewise refer to, abstract, or quote in full A. S. T. M. requirements. Building and other codes, standards for design and construction of machinery, buildings and other structures, roads, etc., and general construction specifications, will refer to A. S. T. M. standards for quality and tests of materials.

3. The standards, where not adopted outright, are used as the basis of specifications written by various units in industry. This is a truly important use of standards; for however desirable it may be to have all interests agree on a single standard where such a thing is possible, it is a fact that the tendency towards individuality in the writing of specifications is a strong one, so that the

setting up of something that can be used as a guide to those who feel they must write their own specifications is a tremendous factor in preventing even greater diversification than exists today. Uniformity in form and arrangement of specifications for materials, which has been brought about through the establishment of A. S. T. M. standards, itself tends to simplify the writing of materials specifications and reduces diversification. In such situations there is gradual convergence towards a common standard, which will come into existence and general use when it becomes evident that the differences between a number of specifications are so minor as surely to justify the setting up of a single specification. An examination of many of the specifications for materials listed in the Directory of Commodity Specifications shows the undoubted influence of A. S. T. M. standards as the basis of specifications written by other agencies.

4. Moreover, the A. S. T. M. specifications have been expressive of American practice and have therefore been of particular value as standards for export business in materials. Since 1916 the Department of Commerce has translated into French and Spanish over 60 specifications for materials active in export trade. Revised Spanish editions of some 35 of these being in greater demand commercially, have been issued; and 15 specifications for materials entering into trade with Brazil and Portugal have this year (1928) been published in Portuguese. These foreign language editions of A. S. T. M. specifications have been distributed by the Department of Commerce among the American Consuls and Commercial Attachés in various countries throughout the world and have been very largely used by American industries engaged in export business.

It is worth pointing out that standards are not always made for immediate use. As in all things, a start must be made. Often standardization projects are undertaken with the definite knowledge that much pioneer work must be done, and perhaps that much prejudice and opposition must be overcome before the benefits of the particular standards will be realized. Hence the first standards of a group developed under these circumstances can be expected to come only gradually into use, and be subject to frequent revisions as further progress is made. There are a number of examples of this kind among materials standards, but such standards, nevertheless, serve the very important purpose of concentrating thought and discussion upon some definite proposal that eventually will lead to effective standardization.

INDUSTRIAL SIGNIFICANCE OF STANDARDS FOR MATERIALS

"Of what real value to producers and users of materials are these standard specifications?" This question was asked much more frequently in the past than it is today, when so many of our industries are keenly alive to the value of standardization. But while much has been accomplished in the introduction of standard specifications and tests for materials into industrial and commercial transactions, much more remains to be done, especially in some of the industries that have been slow to develop standards, and it is here that the answer to this question is of particular interest. The benefits to both producer and consumer in the industries where standard specifications have been applied for any length of time are so evident and so well understood that the question can be answered convincingly. There are such general advantages as result from the thorough knowledge of the properties of a material and its performance in

service; from the increased uniformity and reliability of the material; and from the tendency of quality standards to improve the whole output of a commodity of which any considerable portion is purchased according to such standards.

So far as the producer is concerned, there are certain advantages of particular importance. For example:

1. He is not compelled to supply, for essentially the same purpose, materials ordered to a variety of specifications that may differ by just enough to require separate production under each specification, involving many classifications in production, in stock piles and the like, without commensurate benefit to the user. When a single specification is accepted for such material, quantity production is then possible, with resulting economy in manufacture and distribution that is eventually reflected in lower prices.

2. Under standardization, with respect both to dimensional and quality standards, the manufacturer, in times of general business depression when his orders are low and buying is practically at a standstill, can continue to produce "standard" material knowing that when business picks up there will be a market for it. In this way he keeps his plant running and his organization intact, avoids excessive labor turnovers, prevents large increases of overhead expense in relation to output, can frequently take advantage of favorable market conditions in purchasing raw materials, and in general maintains the efficiency of his operations. Such considerations as these are of great importance in that they substantially reduce the waste in industry, which is an economic burden upon the entire community.

3. The adoption of standards reduces the variety of commodities that must be kept in stock by producers and distributors.

4. The producer knows exactly what he is expected to furnish and how the material will be tested and inspected by the consumer, thus reducing to a minimum the possibility of misunderstandings, which are both vexatious and expensive.

These benefits to the producer are indirectly of advantage to the consumer, of course. But there are certain other advantages that the consumer experiences in the use of standards, which may be enumerated as follows:

1. He can secure truly competitive bids on the same quality of material—a condition that is greatly to his advantage. Truly competitive bidding under a quality specification is welcomed by the progressive manufacturer.

2. The details of purchasing are simplified and standardized—a matter of especial importance in large organizations.

3. Standard methods of test and inspection are of particular value in establishing a routine procedure for acceptance of material.

4. The greater uniformity and reliability of material purchased under standard specifications, and the fact that its properties are more thoroughly understood, make possible its more economic use.

Of course, it costs the consumer something to prepare these specifications and to inspect material purchased under them, but this cost is more than offset by the savings incident to the advantages that have been named.

It may be said in general that careful inspection and testing of material is necessary to insure proper deliveries under any specification. Often the manufacturer will furnish a certified statement that he has tested and inspected the material and that it meets the requirements of the specification,

and such a certificate is generally accepted by the buyer as evidence of satisfactory delivery. While much more might be said regarding the enforcement of specifications, it is well to remember that standard specifications are not a general panacea for commercial ills, and that the thoroughly reliable producer who knows his product, carefully inspects it, and puts his reputation back of it, has just as important a place in industry today as ever.

The importance of standardization in relation to future industrial development can hardly be overestimated. Our industries within comparatively recent times have multiplied very rapidly, and not sufficient attention has been paid to the economies that are possible in simplifying types, design and dimensions of commodities, and in standardizing materials and practice. In its essentials standardization is simply a process of selection of types, designs, materials or practices that in the course of time have thoroughly proved their value to the general community—a "survival of the fittest"—and a concentration upon these types and materials in production and use in the interests of greatest efficiency. It is only recently that industry has become aroused to the necessity of applying these principles of standardization to problems of production, distribution and consumption. If these principles are properly applied, there need be little apprehension that standardization will weaken the incentive to originate, to invent, and to apply in the industries of the world new types, new materials and new processes, —a criticism that is sometimes directed against standardization. Standardization has been accused of "fixing" practice in such a way as to retard desirable progress in industrial development. This has not been the experience of the American Society for Testing Materials in the field of materials; we have found that the introduction of materials standards has conserved time and energy for the study of new developments that otherwise would be occupied with routine matters, and that standards of quality and tests for materials are readily modified from time to time as new developments take place.

CONCLUSION

Interest in and appreciation of the industrial and commercial value of standards for materials has grown rapidly in the past decade. There are many organizations among the professional and engineering societies, industrial and trade associations and others that have a greater or less interest in the development of such standards. The Society is particularly qualified by the character of its membership, the support given to it by industries throughout the country, the principles and procedures upon which its standardization work is founded, and its experience in this field for twenty-five years, to develop standards for materials. It welcomes the cooperation of all groups that desire to engage in the development of standards for materials and it affords the opportunity through its procedure for other groups and for industries, either through companies or through industrial and trade associations that they may have set up, to participate in the formulation, in a thoroughly representative way, of equitable materials standards.

The Standardization Activities of Underwriters' Laboratories

By W. D. A. Peaslee
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UNDERWRITERS' LABORATORIES is not engaged in standardization work as a primary function. It is true that incidental to the performance of the work for which the Laboratories was organized a certain amount of what may be called standardization is brought about. Through its affiliations, however, by means of memberships of its engineers on the committees of various standard-making bodies, it exercises a very strong technical influence on standardization work in many lines.

Underwriters' Laboratories was started some thirty-one years ago in response to a rather definite need that was sensed by the founder of the Laboratories, Mr. William H. Merrill. With his far-sighted analytical mind he foresaw, even before the underwriting organizations were aware of it, the increasing necessity to rate-making organizations of accurate technical knowledge of facts relating to the hazards introduced by the increasing use of the then new force, electricity.

Fire insurance had grown to be a very important factor in commercial credit to the extent that it had become one of the cornerstones of the structure of our very complex commercial credit system in the United States. A long and rather costly experience had taught the insurance companies that insurance rates to be scientific and a basis for a stable and prosperous industry must be based upon an accurate knowledge of the facts regarding the hazards introduced or protection against fire and accident afforded by the use, storage, and transportation of devices and materials used in the conduct of our industrial life. The insurance world was gradually coming to a realization that this was a very technical problem which should only be undertaken by an adequately organized technical staff and for best results this staff should have absolutely nothing to do with the formation, application, or enforcement of rates for insurance. Mr. Merrill had foreseen this and was prepared in a small way to furnish this service.

The first work of the Laboratories was in connection with the then new art of utilizing electricity, and as the value of this work grew in the minds of the insurance companies the small beginning that had been fostered by Mr. Merrill was taken up definitely and its findings accepted by the insurance companies.

System of Councils

In order to maintain the necessary close coöperative liaison between the technical staff engaged in determining scientifically the hazards and protection above mentioned and the insurance organizations who used the technical information thus obtained in the building of rate structures, a system of Councils, one for each engineering department, was formed by the Laboratories consisting of prominent men in the insurance and inspection fields who were without commercial affiliations. Reports by the engineers of the Laboratories presenting the facts obtained from their examinations of devices and

materials submitted to them, together with the recommendations derived from these facts are presented to the Councils for their review before the resulting classifications are promulgated to the inspection authorities and published in the Laboratories' Lists. In this way the field experience of the insurance organizations and the knowledge of what is required from a rate-making point of view is applied to the technical findings of the Laboratories while the Laboratories itself still remains a separate distinct organization entirely separate from the technique and practice of rate making.

Fundamentally in the nature of the work of the Laboratories it is necessary to measure hazards and protection, and the work of the Laboratories may be accurately stated as that of classification of materials and devices from a standpoint of the hazards or protection involved in their use, storage, and transportation. This classification naturally depends upon the use of some sort of a yardstick, and it is in the development of such a yardstick that Underwriters' Laboratories enters the field of standardization to the extent that certain minimum requirements must be set up to be used in judging devices aad materials submitted to the Laboratories for classification.

INDUSTRY CONFERENCES

In order to secure the best practical as well as theoretical knowledge on this subject, the Laboratories has developed a system of Industry Conferences for this purpose. It is the work of these Industry Conferences, consisting of representatives from manufacturers in the Industry concerned, with the Laboratories that results in the establishment of the necessary yardstick or minimum requirements. The Laboratories' engineers, trained in fire protection and prevention work, working with the Industry Conference draft a set of requirements mutually agreed upon that enable the Laboratories to equably discharge their obligations to the insurance organizations, *i.e.*, to furnish them technical information as to the hazards involved and protection afforded by the material or devices examined, that may be used by them in rate making, and at the same time insure a reasonable protection to the public using the devices or materials and not impose upon the manufacturers an undue economic burden in requiring greater refinement than necessary to produce a reasonably safe device for introduction into our industrial life.

The minimum requirements so set up by the Industry Conference and the Laboratories are then submitted to the proper Council and when finally approved by all three interests become the minimum requirement yardstick by which future devices of this class are judged when submitted to the Laboratories. This is, in effect, a standardization in the form of a minimum requirement such as is essential for the fundamental work of the Laboratories.

FOLLOW-UP AND INSPECTION SERVICE

A further and very important work of the Laboratories is the follow-up and inspection service. This is quite necessary, as it is of no interest to the insurance companies to know that a device submitted to the Laboratories and examined by them is classified in a given manner unless they can be assured that all such devices as later manufactured are at least as satisfactory as the devices originally submitted.

This requirement led to the establishment of the inspection and follow-up service whereby through the inspection personnel of the Laboratories all products of manufacturers

which have been given such classification are followed continuously from that time on.

The findings or classifications arrived at by the Laboratories are made public in Lists which are available upon application to the Laboratories to anyone interested and which also have a very wide distribution throughout the inspection organizations, both insurance and municipal, of the country. These lists supplemented semi-annually and revised annually comprise a total of about 800 pages. In addition to this, regular subscribers to the service are furnished a card upon each device or material classified which, issued as soon as the classification is released by Council approval, describes the device in sufficient detail that it may be recognized and identified in the field, and gives the classification in which it has been placed as a result of the facts brought out in the examination conducted by the Laboratories.

GROWTH AND VALUE OF LABORATORIES

The continuous growth of the Laboratories and the widening of their sphere of interest has been a striking proof of the value of the service they have been able to render. It must be borne in mind there is no legal authority back of the findings of the Laboratories.

It will be seen from this structure that it is a democratic method of standardization giving each of the parties interested a representation in the establishment of the minimum requirements and sufficiently flexible to keep pace with the changes and developments in our industrial life. It is opposite to the autocratic and sometimes despotic system resulting from standardization by governmental authorities and is also free from that inertia liable to result from any governmental standardization.

Since it is deliberately formed as a non-profit-making organization, Underwriters' Laboratories is free of commercial interest and able to render a disinterested unbiased judgment based only on facts properly determined.

Formed as it is and being operated and influenced solely by the properly interested parties, it is free from political influence, while at the same time it secures for itself the practical knowledge of the commercial relations that are necessarily involved. The democracy of this method extends even to the follow-up service which is an inspection controlled entirely by consent of the governed.

Due to the gradual widening of the scope of the demands made upon the Laboratories by the insurance organizations it has grown until at the present time there are seven active engineering departments each concerned with a phase of our industrial life which produces hazards important to the underwriting world. These are supported by a large department devoted to the inspection and follow-up service described.

Some industries based on devices and materials inherently hazardous have been developed by this democratic coöperation between the manufacturer, the Laboratories and the insurance authorities to a point where they are now enormous industries bringing a great service to the public without introducing an undue hazard by their use.

An instance of this is the acetylene industry which employs acetylene gas for illumination and also uses it mixed with oxygen for cutting of metals and for welding. The use of acetylene gas has been a great factor in the rapid economic development of our prosperity. Acetylene gas at certain temperatures and pressures becomes extremely hazardous, as under these special conditions it explodes spon-

taneously. Through the work of the Industry Conference and the Laboratories with the coöperation of our Councils, devices for manufacturing and using this gas have been developed which are in wide use throughout the United States with a very pleasing degree of safety and freedom from accidents. At the same time the Laboratories, through this democratic organization, have been able to keep abreast of the progress in the art so that the using public have not been denied the benefit of the latest developments and inventions. The scope of the work of the Laboratories may be sensed from the following brief outline of the activities of the various departments.

CASUALTY AND AUTOMOTIVE DEPARTMENT

Anti-slip material; belt fasteners; belt shifters; window cleaners' belts and anchors; boiler appliances including safety valves; portable elevators; elevator appliances including cable equalizers; door contacts and interlocks and limit switches; panic hardware; electric hand lanterns; garment presses; electrolytic oxygen and hydrogen plants; oxy-acetylene blow pipes and regulators; high pressure gas gauges; laminated glass; goggles; machinery guards and guarding devices; automobile lifts; ladders and ladder feet; refrigerating machines; air tanks; scaffolds; automobile bumpers; automobile brakes; gasoline tank, fill, and vent fittings; fuel feed systems; fuses; ignition starting and lighting equipment; locking devices; mufflers; radiator guards; signals and signalling appliances; switches; theft detection systems; gasolene tractors, and wire.

BURGLARY PROTECTION DEPARTMENT

Burglar alarm systems, central station and local types; safes as to their burglary resistance; locks and locking devices; bandit resisting enclosures; gas and chemical systems; hold-up alarms; safety deposit boxes; collection safes for daylight robbery protection.

HYDRAULIC DEPARTMENT

Pumps; pump governors and controllers; meters; hydrants; gate and check valves; indicator posts; pipe and fittings; automatic and open sprinklers; accelerators and exhaustors; alarm valves; dry pipe valves; quick-opening valves; pipe hangers; sprinkler guards; hose racks and reels; nozzles; hose valves; pressure gauges; wheeled and stationary chemical extinguishers; and fusible links.

GASES AND OILS DEPARTMENT

Acetylene generators for lighting and welding; acetylene torches; various types of gasoline handling pumps; gasolene engine-driven electric lighting plants; internal combustion engines; gas heaters of various types; suction gas producers; gas systems for use in lighting and heating; gasolene gas machines; gasolene lamps; gasolene cook stoves and heaters; kerosene stoves and heaters; incubators and brooders; oil burners for industrial and domestic use; oil-burning forges and torches; safety cans for hazardous liquids; above ground, underground, and portable storage tanks for hazardous liquids; unions for hazardous liquids, emergency gas shut-off valves; hand fire extinguishers generally known as first-aid fire-fighting appliances including 1½-, 2½- and 5-gallon soda-acid extinguishers, 1½-, 2½- and 5-gallon foam extinguishers, hand pump extinguishers; special types of extinguishers using CO_2 gas stored under high pressure.

PROTECTION DEPARTMENT

Safes; vault doors; fire doors; hinges, locks, hangers, and other fire door ac-

cessories; fabricated blocks of concrete and gypsum; metal lath and other mineral bases to receive and support plaster, metal windows glazed with wired glass, fire shutters; roof-covering materials, building columns, partitions, floors, and various building materials and fire retardants.

CHEMICAL DEPARTMENT

Equipment for use in hazardous and extra hazardous locations including electric motors for use in explosive gas, vapor, or dust-air atmospheres; electric switches and control apparatus for use in explosive gas, vapor, or dust-air atmospheres, lamps, heaters, and miscellaneous equipment for transportation, loading, etc., such as trucks; flame arresters; vent valves for oil storage tanks; fumigants and insecticides; refrigerants; flame-proofed fabrics; films (slow-burning); gas detecting and recording devices; anaesthesia equipment; rubber-lined fire hose; linen fire hose; chemical engine hose; gasolene hose; rubber-covered wires, cords, and cables; electrical tapes; floor oils; sweeping compounds; cleaning fluids and materials; thinners for paints and varnishes; millinery glues; metal polishes; solvents; waterproofing materials; gasolene resisting cements; fertilizers; pyroxylin products; liquefied petroleum gases; extinguisher liquids; foam-producing ingredients and foam charges; anti-freeze extinguisher charges; soldering fluxes; conduit; corrosion resisting metals and alloys; roofing; non-sparking alloys; protective coatings for metals and alloys; terne plate for fire doors; glass cylinders for visible measuring gasolene pumps; carbon blacks; oil resisting paints; tear gas bombs and canisters; textile fibers; fire-resistant safe insulations; compressed oxygen and hydrogen; matches; garage heaters; fuel oils; spontaneous ignition; gas and vapor explosions.

ELECTRICAL DEPARTMENT

Armored cables, cords, and fittings; cabinets and cutout boxes; candelabra and miniature lamp receptacles and sockets; car heaters, electric; Christmas tree lighting outfits; circuit breakers, air-break type; conduit and fittings; fiber, flexible (steel) rigid aluminum, and rigid steel conduit; current taps, cutout bases; elevator appliances; films, slow-burning; fixtures; fixtures and fittings; ground clamps; heaters, cooking and liquid; electric air heaters, electric car heaters, industrial and laboratory heaters, flat irons and ironing machines; insulating devices and materials; lamps and lamp fittings; lightning rods and fittings; motors for use in explosive atmospheres; musical instruments (electric); non-metallic sheathed cable; office appliances; outlet boxes, plates and fittings; paints, insulating; panelboards; picture machines and appliances; raceways for surface wiring; radio appliances; receptacles; rectifiers; refrigerating appliances; resistance appliances; sealing compounds; signal appliances; signaling systems; signs, electric; sign flashers; sockets; automatic switches; enclosed switches; knife switches; oil break switches; snap switches; temperature regulating appliances; time-recording appliances; toys; bell-ringing transformers; power transformers; flexible tubing; ultra-violet ray machines; vapor-proof fixtures; varnished cloth wires; welding machines; wires, asbestos-covered, fixture, flame-proof, flexible cord, rubber-covered, slow-burning, varnished-cloth, weather-proof; and X-Ray apparatus.

RESULTS

The natural result of all this work has been the development of a group of experts on the Staff of Underwriters' Laboratories, whose services are eagerly sought by the committees of the

various standard-making bodies of the United States on account of their expert knowledge over a very wide field. Committee work takes a great deal of the time of these experts, but it increases their usefulness to the public, and broadens their contacts in a manner that is very helpful to the Laboratories. During 1927 twenty-seven members of the Staff of Underwriters' Laboratories served on two hundred and twenty-nine committees in thirty-five different National organizations, societies and conferences devoted to standardization work as such in the United States. Seventeen of these members were chosen chairmen of their respective committees. It is through these contacts that the real influence of Underwriters' Laboratories is manifested in standardization activities in the United States.

Simplification's Boons to Purchasing Agents

By W. L. CHANDLER
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THERE was once a chief executive who was afraid his purchasing agent would standardize the styles of women's clothes. He didn't know that has long since been accomplished.

There are many people who still believe that standardization takes all the joy, beauty and individual self-expression out of life. Those people forget that everything God creates is standardized. Every tree, dog and man must meet divine specifications—and yet no two individual instances are ever alike. Without so much standardization of design there would be no digestion, no propagation, no medicine, no speech, no thought, no existence.

In the manufacturing and commercial world there are many benefits to be derived from further simplification, so that men in identical situations can speak the same language and doctor their identical ills with the same castor oil. Some of these benefits are already being realized in a partial way. These can be expanded to greater service and others begun and developed.

A vast number of purchasers would benefit from greater service or use which would be derived from simplified articles. For example, office desks are a horrible example of the need for simplification. Most concerns buy desks from time to time as need arises. When business changes require rearrangement of desks in offices, attempts are frequently made to regroup desks in sets to minimize aisle space. At such times it is usually found that the desks are not of uniform height and that desks of a given length are of varying width. The result looks like a terraced garden.

At the request of the purchaser of a large life insurance company the National Association of Purchasing Agents recently asked Ray M. Hudson, Assistant Director, Bureau of Standards, to call a conference of manufacturers, distributors and users of desks to discuss the simplification of desk sizes. Several such conferences were held, but it was not possible to get manufacturers and distributors to agree on dimensions which would be mutually satisfactory. This was most disappointing to the Association.

The potential benefits to its members are such that having failed through coöperative efforts, the National Association of Purchasing Agents has appointed a committee. That committee is instructed to study the situation and to recommend the sizes which its members should adhere to in their purchases. Some day the purchasers will benefit from that movement in simplification.

BENEFITS DUE TO OPPORTUNITIES FOR GREATER USE

While this is still being worked out there are many other projects where all parties at interest have agreed on the simplification of commodities. Hotels, railroads, steamships, hospitals and institutions have benefits from greater use, fitness and flexibility from simplification of beds, mattresses, springs, blankets, sheets, chinaware, plumbing fixtures and other commodities. Purchasers in the industries, public utilities and government agencies derive benefits in some degree in greater flexibility from the list above mentioned, but more particularly from the commodi-

ties definitely associated with and used by their companies.

The simplification of milk bottles and caps has a very definite bearing on a large group of industries and indirectly on ultimate consumers. Steel lockers, milling cutters and grinding wheels will serve as illustrations of classes of commodities where benefits through greater usefulness are found.

GREATER EASE IN PROCUREMENT

Grinding wheels, however, also serve to illustrate another form of benefit, that of greater ease in procurement. Until the Division of Simplified Practice undertook, at the request of the industry, to bring together those interested in grinding wheels there existed over 715,000 varieties of these wheels. One might conclude that with such a large assortment from which to choose, a purchaser need have no difficulties in procurement. But the condition was quite different. There were so many varieties that manufacturers and distributors could not begin to carry adequate stocks to supply demands from such a wide range. Consequently each purchaser in his supervision of stores for his company was forced to maintain his own stock of grinding wheels to fit the varied demands of his shops.

After simplification, 64 per cent of these varieties were merged with others, eliminating some shades and tints of difference which had grown up because, like Topsy, the grinding wheel industry had "just growed."

After the first steps in simplification there still remain over 250,000 varieties of wheels, but the situation is vastly improved. The fullest benefits from this work are yet to come, but much good has already been accomplished. Distributors will benefit greatly from the work. There will be more effective stocks maintained by distributors and manufacturers and less stock held by consumers.

Similar benefits in procurement are present for purchasers in the building trades and highway projects through simplification of building and paving brick, tile, cement blocks, metal lath, reinforcing bars, structural and roofing slate, eaves trough, conductor pipe, builders' hardware, asbestos paper and millboard, lumber, asphalt, and many other commodities.

Buyers in other lines benefit through purchase of many of the above commodities but, in addition, it is easier to procure their simplified requirements in files, rasps, lumber, forged tools, paper, plow bolts, cotton duck, sheet steel, steel barrels and drums, tacks and nails, shovels, die head chasers, wrought pipe, valves and fittings, steel scrap, and numerous other commodities.

GREATER KNOWLEDGE

A third type of benefit comes from greater knowledge of commodities. As a result of the various Washington conferences, purchasers know more about the fitness of different varieties of materials for specific purposes and are thus able to choose varieties and qualities which are best for the existing purposes.

Some commodities of importance from the standpoint of selection for a purpose are: range boilers, woven wire fencing, bed blankets, hot water storage tanks, chinaware, piston-ring oversizes, as well as the grinding wheels and others previously mentioned.

This type of benefit, selection for a purpose, also involves a type of simplification not yet mentioned, namely simplified invoices. The use of invoices is tremendous. They have existed in such variety of size and form as to preclude description. There were over 400,000 varieties in use. Now all parties at interest have agreed

upon one: the Simplified Invoice Form, for general use. The enthusiasm of purchasers may be judged from the fact that the National Association of Purchasing Agents started the campaign for a standard invoice form in 1918, and has been actively pushing it ever since. A careful survey and estimate indicates a potential annual saving of 15 million dollars when the simplified invoice form has come into general use.

When invoices are all of standard size, and when a clerk may rely upon finding each item of information sought in a definite place on the form, there will not only be the financial benefit but invoices will be audited more promptly, less complaints about cash discount abuses will be heard, and invoices may be filed and found more readily. Another benefit from simplified invoices concerns the vendor, but may well be mentioned here. Formerly, because of the great need for standard invoices, many large corporations designed their own individual private forms and required all bills rendered against them to be on these forms which they provided. In sales of certain industries these private customer invoice forms were particularly embarrassing and involved much extra cost in billing departments of the vendors.

This Simplified Invoice Form designed to benefit the purchasers has thus proven a boon to vendors as well.

The National Standard Catalog size is another form of simplification, originated by the purchasing agents for their own benefit, which has proven of greatly increased value to vendors.

Formerly catalogs were of so many sizes that they were invariably filed according to size. Efforts made to maintain card files to index these catalogs by commodities were ludicrous, because indexes could not be made comprehensive. Consequently catalogs, being improperly indexed, were often lost sight of.

Now catalogs of standard size, 7¾ x 10⅝, are classified according to lines of commodities, and may thus be easily referred to when needs arise. Simplification of warehouse forms and of bank checks, notes, drafts and similar instruments also benefit purchasers, but to less extent than they serve some other types of executives.

DOLLAR BENEFITS

The fourth type of benefit has made less progress in its development. However, it will become a definite and substantial benefit as time goes on. I refer to dollar benefits to purchasers from lower costs of production, distribution and use as demand is directed and diverted to the channels of simplified practice. Some of these lower costs have come about gradually, and competition has brought them out to the consumer. But where the simplification has been complete, and all other varieties abandoned, there are no opportunities for comparison of prices. On the other hand, standard checks, for example, may be bought for two or three dollars per thousand less than the non-standard. In the case of standard catalogs the purchaser benefits on price because, while the standard increased the amount of paper in the average catalog page 50 per cent, it permits 100 per cent more type matter to appear on the page. The consequent reduction in number of pages enhances the effectiveness and reduces the cost of catalogs.

In the case of building materials and many commodities sold by bid or quotation, the savings are lost sight of, but are there just the same. Because human nature is as it is, simplification would be much more in demand if these

price benefits were presented in more spectacular fashion.

The four types of benefits are becoming increasingly recognized and the expansion of interest is rapidly accelerating. As this interest develops the dollar benefits will become more and more evident and will awaken a general demand for simplification in many more directions by production and purchasing executives.

As evidence of the relation between simplification, dollar saving, and the most effective way of accomplishing the end desired, we may consider the methods used in the automotive field. This entire industry is a monument to simplification.

When an automobile manufacturer determines upon further simplification, he immediately translates that determination into the language his customers can best understand. He lowers his price. He does not wait until the savings have accumulated in his cash box before passing some of them on to his customers.

The price reduction really makes possible the accomplishment of the plan of simplification because the automobile buyers obey the impulses thus created and volume production results. Manufacturers, distributors and consumers reap the benefits.

This method of handling price with simplification cannot be applied to all lines of business. It remains for someone who does not know that to accomplish the results.

HOOVER, THE FATHER OF SIMPLIFICATION

The Honorable Herbert Hoover, long before he occupied his Cabinet position, pointed to the then approaching, now present era of competition, not only between businesses but between trades and between nations. He has since given us the Division of Simplified Practice, and more recently the Commercial Standard Group of the Bureau of Standards, through which business men may work out for and by themselves the simplification projects of greatest value.

Competition is furnishing the dollar urge which is leading more and more trades to call upon these organizations for help. About 70 projects have been closed with others in progress thus far, but the purchasers are clamoring for more and yet more that their benefits may increase. The National Association of Purchasing Agents should be and is willing to continue to carry on as the organized representative of consumers.

Years of intimate contacts in production, sales and purchasing with thousands of those who make a profession of purchasing lead me to feel that the principles of simplification may be applied successfully to most commodities and many business practices with definitely beneficial results. Such simplification methods would extend the benefits to all industries, public utilities, institutions and government agencies which constitute primary consumers and which are represented by professional purchasing agents. This movement will do much to help solve some of the numerous problems of distribution and production before us today.

We are all inclined to be so self-centered in our thinking and to adhere so strenuously to our pet ideas of what we require to run our plants, or what we must do to market our products, that we sometimes become obsessed and do not always appreciate our need for simplification. Too often, we must have its benefits forcefully presented to overcome our obsessions.

The dollar is the most forceful overcomer of obsessions. I, for one, hope to see the dollar benefits stressed more

emphatically in the future. Knowledge of the benefits of simplification and of the needs of those who may reap the benefits leads me to hope that we may be able to aid business men in expanding this work, to help business to realize more of the potential benefits which will surely come as we think more in terms of the future and less in those of immediate self-interest.

Development of Standard Safety Codes

By David Van Schaack

Chairman, Safety Code Correlating Committee, American Engineering Standards Committee; Director, Bureau of Inspection and Accident Prevention, Aetna Life Insurance Company, Hartford, Conn.

ONE of the most interesting developments of the last decade or two has been the rapid increase of interest in industrial safety. It was only natural that the astonishing progress in machine production which has placed the United States in the forefront of industrial nations should direct attention to the human waste accompanying it. Machines were first built and placed with regard only to their productive capacity, but the adverse effect of the operation of unguarded machines and those only partially guarded gradually became more and more apparent as the waste of human life and limb resulting from their use attained such proportions that it demanded notice. This waste, of course, made its first appeal to the moral sense, but this was soon supplemented by a steadily increasing belief that accidents in industry have more than an humanitarian aspect—that they have such an effect upon production that they must be taken into consideration from the economic viewpoint.

These two considerations—humanitarian and the economic—have given tremendous impetus to a movement to reduce accidents to the lowest number on the part of all who are naturally concerned with them in one way or another. Many of our larger industries have made organized accident prevention work an integral part of operation. The states have by law and otherwise encouraged the creation of safer working conditions. The insurance companies have lent their influence with their assured to the attainment of the same end. There has been a general effort to cope effectively with the accident problem, of which effort the latest phase is the movement initiated a few years ago for the development of uniform safety codes.

Origin of National Safety Codes

The immediate reason for national safety codes is found in a number of causes—workmen's compensation laws; state laws and municipal ordinances for the protection of workers; regulations of state labor departments and industrial commissions; standards set up by insurance companies for determining the relative hazards in plants insured by them. These proximate causes all hark back to one original cause—new appreciation of the values of human life and limb—and are simply different manifestations of a keen desire to realize these values. It was quite natural, as in all pioneer movements, that the several agencies interested in promoting safety should work independently toward the same end, but the vital need of an attempt to standardize all these efforts soon became apparent. In 1919, therefore, at the suggestion of the National Safety Council, the Bureau of Standards sponsored two conferences at Washington to consider the advisability of such standardization and the best method of forwarding it. There was complete agreement as to the need for uniform and national standards, and

it was finally decided that safety codes could best be prepared under such a procedure in formulating national standards as had been set up by the American Engineering Standards Committee, if the scope and membership of this committee were enlarged so as to make the plan widely acceptable.

The necessary action was promptly taken by the American Engineering Standards Committee. A safety group was added to its membership, and a national safety code committee was formed to act as an advisory committee in relation to the development of national safety codes. This committee is now known as the Safety Code Correlating Committee, and its membership is widely representative of those concerned in safety matters. The United States Bureaus of Standards and Labor Statistics, the International Association of Industrial Accident Boards and Commissions, the Association of Governmental Labor Officials, the national associations of casualty insurance companies, the National Fire Protection Association and the National Safety Council are represented on it as well as engineering societies and some of the leading industrial associations. Work on safety codes is under the advisory direction of this committee, the functions of which include investigating the need for particular codes, defining and limiting the scope of codes, considering the interrelation of codes, passing upon the personnel of technical committees, following up the progress of work on codes, and acting as a general clearing house for matters concerning them. It performs one or more of these functions as may be necessary in connection with all safety codes except those in the field of mining standardization, which are referred to a similar committee known as the Mining Standardization Correlating Committee.

PROCEDURE OF THE AMERICAN ENGINEERING STANDARDS COMMITTEE

Inasmuch as the American Engineering Standards Committee is not an initiating body, work on a code project is undertaken only upon formal request from a responsible body, and then only after the committee has assured itself that it is the desire of industry and others interested that the work shall go forward. A consensus on this point is obtainable in any one of several ways. Generally speaking, the most satisfactory method is to call a conference of the bodies presumably interested in such a project, and ask this conference to decide whether the work shall be undertaken, and, if so, what its scope shall be, how it shall be organized, and how it is related to other work. When such a general conference is not practicable, the opinion of those interested is obtained through a questionnaire or through a special committee composed of representatives of the bodies principally concerned.

When an existing standard is submitted to the American Engineering Standards Committee for approval under its procedure, it is referred to a special committee to investigate whether it has been developed by an organization and procedure conforming substantially to the procedure of the American Engineering Standards Committee or has by actual practice proved its right to become a standard. Steps are taken also to secure information from the technical press and the industrial associations and technical bodies interested regarding the way in which the standard submitted is meeting the needs of industry.

In the case of safety codes, other than those having to do with mining, the Safety Code Correlating Committee coördinates in a capacity advisory to

the American Engineering Standards Committee on the standardization work suggested to, or undertaken under the procedure of, that committee. Organized as it is in a way so broadly representative of the interests concerned in the promotion of safety, it can assume to a considerable extent a major responsibility in deciding whether code projects shall be undertaken.

Once the general desire of those concerned that a code project shall go forward has become evident, an organization, or organizations, outstanding among those interested is asked to act as sponsor for the proposed code. The duties of a sponsor are to suggest the membership of a joint technical committee (officially called a sectional committee) to formulate the code provisions, and to see that the work of making the code is carried on in an effective manner. It is just as necessary, if a code is to become of real practical value, that its provisions represent a consensus of those interested in it as that the need for a code be generally appreciated. A sectional committee for a safety code, therefore, is approved by the American Engineering Standards Committee on recommendation of the Safety Code Correlating Committee only when it includes a balanced representation of those concerned with it. This representation covers:

1. Manufacturers (makers of the equipment).
2. Employers (purchasers, owners, users of the equipment).
3. Employes.
4. Governmental bodies having regulatory power or influence over the field in question.
5. Qualified specialists, such as staff representatives of technical societies, consulting experts with no exclusive business affiliation, and educators.
6. Insurance representatives.

The formulation of a code is thus placed in the hands jointly of those responsible for the administrative and legal aspects of the problem involved, those who must face the technical, industrial and financial sides, and those who have to face the hazards to life and limb. When a code has been formulated, it is recommended by the sponsor for approval as American Standard, Tentative American Standard or Recommended American Practice by the American Engineering Standards Committee, which refers it to the Safety Code Correlating Committee to pass upon the questions as to whether the procedure has been followed and the vote of the technical committee upon the completed code shows a sufficient consensus of opinion. Upon favorable report, the code is then approved and is ready to be brought to the attention of government officials, insurance companies and the industries concerned as a national standard. The technical committee is continued in existence both to provide for revisions of the code as such may become necessary, and to interpret the provisions of the code upon need arising.

SAFETY CODE CLASSES

The safety codes thus developed are of two general classes, one of which deals with specific machines or devices, and the other with certain industries as a whole. Upward of 40 code projects have been undertaken under this American Engineering Standards Committee procedure, and 23 codes have been completed and approved as either American Standard or Tentative American Standard.

The codes which have already been completed are the following:

American Standard

Code on Lighting Factories, Mills and Other Work Places

Safety Code for Elevators and Escalators
Code for Lighting of School Buildings
Safety Code for the Use, Care and Protection of Abrasive Wheels
Safety Code for Power Presses and Foot and Hand Presses
Safety Code for Mechanical Power Transmission Apparatus
Safety Code for Colors for Traffic Signals
Gas Safety Code
Safety Code for the Protection of Heads and Eyes of Industrial Workers
Safety Code for the Prevention of Dust Explosions
Electrical Safety Code ("National Electrical Safety Code")

Tentative American Standard

Building Exits Code
Safety Code for Ladders
Safety Code for the Protection of Industrial Workers in Foundries
Safety Code for Aeronautics
Safety Code for Automobile Headlighting —Laboratory Tests for Approval of Electric Headlighting Devices for Motor Vehicles
Safety Code for Automobile Brakes and Brake Testing
Safety Code for Woodworking Plants
Safety Code for Logging and Saw Mill Machinery
Safety Code for Pulp and Paper Mills
Safety Code for Laundry Machinery and Operations

Recommended American Practice

Safety Code for Forging and Hot Metal Stamping
Safety Code for Point of Operation Hazards of Rubber Mills and Calenders

Codes in one stage or another of formulation are as follows:

Safety Code for Construction Work
Safety Code for Floor and Wall Openings, Railings and Toe Boards
Safety Code for Walkway Surfaces
Safety Code for Window Washing
Safety Code for Mechanical Refrigeration
Safety Code for Machine Tools
Safety Code for Compressed Air Machinery
Safety Code for Conveyors and Conveying Machinery
Safety Code for Mechanical Power Control
Safety Code for Plate and Sheet Metal Working
Safety Code for Cranes, Derricks and Hoists
Code on Protection Against Lightning
Safety Code for Textiles
Safety Code for Tanneries
Safety Code for Industrial Sanitation
Safety Code for Exhaust Systems
Safety Code for Amusement Parks
Code on Colors for Gas Mask Canisters

The careful method of procedure outlined is calculated to result in the development of codes representing as nearly a full national consensus as is humanly possible; but it will readily be appreciated that the making of a code is only part of the code problem. If codes are to be of real value, they must be used as well as made.

PROMOTING THE USE OF NATIONAL SAFETY CODES

A very important part of the Safety Code Correlating Committee's work is, therefore, promoting the use of the national safety codes as developed. In carrying on this work, it is following a plan which is designed both to secure the widest possible publicity for the codes and to bring them directly to the attention of the principal agencies through which their use can be brought about—the states, the insurance companies and the industries.

The practice of the states in their efforts to promote accident prevention are far from uniform. Some states have statutory requirements for accident prevention; others have such requirements and a staff of factory inspectors to enforce them; others have a board, official or commission with power to make detailed regulations, usually with reference to only one subject or industry; and still others

have officials or commissions with power to make detailed regulations for industries in general and with a staff of inspectors to enforce both statutory requirements and commission orders. Through the kindly offices of the United States Bureau of Labor Statistics, all codes as completed are printed, except where the sponsor for a code desires to do the printing, and are brought to the attention of the authorities having to do with accident prevention in the several states. The codes are thus put into a position to receive consideration in connection with whatever practice is followed by a state in its accident prevention work. Practical results from such consideration are naturally slow in being realized, and the extent to which these results go vary.

THE EXTENT OF THE ADOPTION OF NATIONAL SAFETY CODES

Replies to a questionnaire sent out by the Bureau of Labor Statistics in 1926 to ascertain to what extent the states were making use of the national safety codes, or were formally adopting them, showed that the codes had received favorable attention in quite a number of instances. New Jersey was pursuing the policy of adopting all the national safety codes as developed, and of revising in conformity with them such codes of its own as had been previously formulated. All the safety standards of Wyoming were those covered in national codes. Utah had adopted in full several of the national codes and in part a number of others. Tennessee had adopted a number of safety codes, in the making of which the provisions of the national safety codes had received full consideration. In Montana, none of the national codes had been formally adopted, but state requirements were substantially the same as those of the codes. New York coördinated its codes with the national codes so far as possible. Pennsylvania's policy was to adopt national codes whenever the provisions were applicable to conditions in Pennsylvania. California had not yet used the national codes as a basis of any orders adopted by the state commission but planned as revisions were undertaken to study the codes carefully and adopt the national standards whenever possible. Massachusetts was giving full consideration to the provisions of national codes in adopting rules for its accident prevention work. Wisconsin was planning in the revision of its general safety orders to make use of all the national codes applicable to Wisconsin conditions.

Several of the other states, while not adopting any of the national codes, have either made rules which, though not so detailed, are substantially the same as the provisions of the national codes, or have instructed their inspectors to be guided by these codes in carrying on their accident prevention work in the industries of the states. The Bureau of Labor Statistics sent out another questionnaire in 1927, and it is reasonable to expect that when the replies are all in, they will show even more favorable results.

The National Bureau of Casualty and Surety Underwriters has approved the national safety codes in principle, and specifically approves individual codes as rapidly as they are recommended to it by its engineering committee. When a specific code is so approved, the Bureau brings this code to the attention of its member companies, suggesting that each company instruct its inspectors and engineers to follow the provisions of the code in their work except where a different standard is required by state law or municipal ordinance or by the provisions of the Industrial Rating Sched-

ule. The National Association of Mutual Casualty Companies is giving consideration to a proposal emanating from its engineering committee that it take similar action. The advisability of the few differences between the industrial rating standards and the national codes being adjusted so that these will be in uniformity in all respects has been brought to the attention of the National Council on Compensation Insurance, which will undoubtedly give consideration to the matter when any revision of the industrial rating standards is undertaken.

GENERAL PUBLICITY

The work of giving general publicity to the codes and bringing them to the attention of industry with a view to their voluntary adoption covers a broad field of effort. A considerable part of this work is being carried on by the National Safety Council through various activities. As each national code is approved, it or an article summarizing it is published in the *National Safety News*. A copy of the code is sent to each of the trade journals representing the industry to which the code applies, and the journal is urged to give all possible publicity to it. The Council writes to all national associations and organizations interested in the code, and to as many state and local associations as possible, urging them to give publicity to the code, and offering free copies for distribution among their local chapters or their members. The managers of the local councils throughout the country are urged to coöperate in promoting the adoption and use of the code by the industries in their territory naturally interested in it. Letters are sent to selected lists of Council members suggesting voluntary use of the standards of the code in their own plants.

In addition to this work by the National Safety Council, each member of a sectional committee developing a code is urged, when the code has been approved, to give all possible publicity to it, and particularly to bring it to the attention of the associations, local branches of associations and other organizations of which he may be a member. Engineering societies and other organizations which may have been concerned in the preparation of codes or may contemplate such preparation in the future are also urged to submit codes already prepared to the procedure of the American Engineering Standards Committee with a view to giving them the additional authority and appeal resulting from a national consensus, and to give consideration to national codes already prepared in the formulation of such codes as they may plan to undertake.

PROGRESS OF DEVELOPMENT

It will readily be appreciated that the safety codes developed under the procedure of the American Engineering Standards Committee will necessarily be slow in reaching a truly national status—national in their use as well as in the method by which they are developed—but the Safety Code Correlating Committee believes that while the progress will be gradual, the forward movement cannot fail to reach its goal. It is practically inconceivable that codes developed through reaching a national consensus of all interests concerned can fail to command general respect and come into common use.

IMPORTANCE OF ADOPTION

From the point of view of the Safety Code Correlating Committee, the voluntary adoption of the codes by industry is perhaps the most important factor in reaching the desired end. The importance of safety work is

steadily becoming more and more appreciated by industry, not as an humanitarian side issue, but as an integral part of successful production. The cost of industrial accidents is no longer measured in terms of insurance premium or other direct outgo for compensation or indemnity according to law. That the so-called incidental costs amount to several times the direct outgo is clearly evident to a rapidly increasing number of industrialists.

Safety is, therefore, becoming a major, rather than a minor, consideration to the thinking employer, who seeks to give weight to every real factor affecting his success. A well-known steel man pictured the place of safety in industry very forcefully when he said of his own company: "Safety is just as much a part of operation as a blast furnace or an open hearth." And this is not an isolated instance. A recent scientific study, covering a wide range of industry, indicates plainly that the most productive plant is at the same time the safest plant.

The appeal of the national safety codes to industry is particularly strong because of industrial representatives having a direct part in their formulation. No recommendation could be stronger. This same reason commends the codes to state boards and commissions and to insurance bureaus and boards. Not only have they themselves had a full share in preparing the codes, but the participation of industry is convincing to them of the practicability of the code provisions as applied to industrial operations, in which they are just as much interested as industry itself.

It would seem, then, that in view of the large and fast increasing interest in accident prevention, and of the fact that national code projects are undertaken only when there is a real demand for them, and are formulated only through the taking of a national consensus, these codes need only the widest publicity among those directly interested in safety to bring about their widespread use.

Safety Standards in Industry

By W. Dean Keefer
Chief Engineer and Director, Industrial Division, National Safety Council

THE frequency and severity rates[1] of accidents in industry in the United States are on the decline if the results of a study recently completed by the National Safety Council can be accepted as typical of American industry as a whole.

For this study, the investigator secured the accident records of 687 companies in twelve industries for the two years 1925 and 1926. The joint frequency rate of these companies was decreased 7 per cent and the severity rate declined 9 per cent.

In spite of this progress, however, it is quite evident that still better records can be established, not only by these 687 companies, but more particularly by the remainder of the 196,000 manufacturing plants that are operating in this country, and that further progress depends upon the ability of industrial managers (1) to devise better and safer operating methods, and (2) to perfect their plans for teaching safety to the workers and their supervisors.

Before making any radical changes, it of course is necessary for the individual manager to study existing conditions and to determine in his own mind just what methods are now being used to the best advantage not only in his own plant, but also in the plants of his competitors. He will want to make sure that every available scrap of scientific and practical knowledge is at his disposal, that all suggested improvements are adaptable to existing conditions, and that each new expenditure can be justified by savings in production, operating efficiencies, or accident costs.

It is in this way that "standards" are developed, and fortunately the manager is saved a great deal of time and trouble because much of this standardization is being done for him (but with his coöperation) by the equipment and machinery manufacturers, his trade associations, various engineering societies, the American Engineering Standards Committee, and the National Safety Council. These and many other organizations are rendering a specific service that no manager can afford to ignore.

Standards for Equipment and Operating Methods

The American Engineering Standards Committee, for example, through its Safety Code Correlating Committee and its Mining Standardization Correlating Committee, has organized some fifty-five technical committees to study such subjects as ladders, grinding wheels, power presses, etc. The personnel of each of these technical committees includes a group of ten to forty experts representing the leading organizations of the country interested in the given subject, thus assuring the development of a report or code that is correct and comprehensive in every detail.

Progressive managers in all industries are working and coöperating in the formulation of these codes, and as

[1] Accident frequency rate is the number of lost time accidents per million hours worked.

Accident severity rate is the number of days lost due to accidents per thousand hours worked.

A lost time accident is an accident which causes death, permanent disability, or loss of time beyond the day or shift during which the accident occurred.

rapidly as a new one is completed it is adopted as an industrial standard to be used as a guide for engineers, superintendents, foremen, and others who have charge of industrial operations. As industrial equipment and operating methods are improved, these codes are revised, so that each code presents the new and up-to-date ideas that can be recommended for immediate adoption.

STANDARDS FOR SAFETY EDUCATION

Experience has shown that the standardization of industrial methods and equipment is extremely important in increasing production efficiency. It also helps in decreasing accidents and accident costs. Nevertheless, the safety education of supervisors and workers is equally effective and necessary. The standards for safety education, though not developed in code form, are as easily obtainable as are standards for industrial methods and equipment.

These educational standards particularly emphasize the need for employing or appointing one man to supervise the safety work in each plant. This man might be assigned such duties as investigating all accidents, supervising first aid, fire fighting and mine rescue work, keeping records of accidents and safety suggestions, making safety surveys, supervising safety committees, etc. Without a safety man, educational work among the supervisors and workers is likely to fail; success demands an organized plan well formulated and well supervised.

Emphasis is also given the necessity of selecting a sufficient number and the right type of supervisors who not only know the safe and efficient operating methods but who also have the ability to teach these methods to the men working under their supervision. In other words, organization has a great deal to do with the success of any educational program.

Supervisors must then be given an opportunity to hold meetings from time to time to discuss their common problems—and accident prevention in particular. They should have access to trade journals and safety publications to increase their own funds of information which can be passed on orally to the workers.

Educating workers in safety is a job which challenges the ingenuity and ability of every industrial manager and supervisor. New ideas are being developed continually and necessitate considerable flexibility in working out detailed plans. Yet certain activities have secured such substantial results that the underlying principles remain unchanged standards. Such activities include the use of safety posters, publication of a company magazine, the use of safety signs, rule books, suggestion systems, and classes in first aid, distribution of printed matter such as pay envelope enclosures, special letters, hand books and safety calendars, organization of safety committees, safety meetings, use of motion pictures, stereopticon slides, prizes and bonuses for safety, etc. Pamphlets on all of these and many other subjects can be secured from various insurance companies, state labor departments, the National Safety Council, and other organizations.

If the annual toll of accidents in industry is to be cut down to the point to which it should be cut, safety must be made an integral part of the operating procedure of each plant. Contrary to the interpretation that is often given the term, standardization does not retard progress. On the other hand, it automatically eliminates nonessential and worthless variation, pointing a directing finger toward development along correct and reasonable lines.

Performance Standards in Industry

By Joseph A. Piacitelli

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THE establishment and maintenance of standards are primary essentials in an installation of scientific management. They lie at the root of the planning and control of operation which serve as a basis of the scientific management of an industrial unit. The principles underlying such a system were set down by Taylor when he arrived at the conclusion that traditional methods of control and production must make way for systematic research towards the standardization of methods, materials, tools and the performance in accordance with the standards derived from the research.

Taylor's aim was to set piece rates, and in order to do this it was necessary to establish standards of performance which in turn required the complete standardization of methods, materials, quality of output and equipment including machines, tools, fixtures and pieces of equipment used for facilitating, handling, transporting or storing materials and the finished products.

> This complete standardization of details and methods is not only desirable but absolutely indispensable as a preliminary to specifying the time in which each operation shall be done and then insisting that it shall be done within the time allowed.[1]

It is the purpose of this paper to discuss the fundamentals upon which performance standards are based, and to point out some of the important factors, controlling the setting of these standards, in such a way that they will serve advantageously the employee as well as the employer.

[1] "Shop Management," by Taylor.

Methods of Establishing Standards of Performance

There are several methods used to establish standards of performance, each having its own particular slant, and are known today as Time Study, Motion Study, Micromotion Study, Time and Motion Study, Job Analysis, Operation Study, etc. There is no doubt that their purpose is the same regardless of the name given them. The writer must say, however, that although their purpose may be the same, namely, that of establishing the best method of performing a certain operation and determining the time in which the worker is expected to perform it, they do not all produce the result in the degree of accuracy that may be desired. In this fact lies the difference between these various technics, which may be grouped into two classes, such as Time Study, Operation Study, and Job Analysis in one and Motion Study, Micromotion Study, and Time and Motion Study in another. For the sake of brevity the writer will discuss these two under the subjects of Time Study and Time and Motion Study, respectively.

In the former class all observations relative to methods, equipment, tools and surrounding conditions, or, in fact, anything that will have bearing on the job, are made with the naked eye. Time records are made by first standardizing the method and then breaking it up into subdivisions suitable for stop watch observation and finally, using such a timing device, the time for each subdivision is observed and recorded.

In the latter class a simultaneous record of the method and time, as well as the layout of equipment, machinery and tools is made with a motion picture film.

The time element is recorded by placing a clock in the field of the camera. The dial on this clock is graduated into 100 divisions and its hand makes 20 revolutions per minute, thus making it possible to read the time value in units of 1/2000 of a minute. Using this method of recording, advance standardization of the method is not necessary. Standardization follows the establishment of the best method which is the result of analysis. In the former, the time element is considered the most important factor towards the solution, while in the latter, the method employed receives the greatest emphasis. It must be remembered though, that regardless of the particular technic employed, both the time and method are considered.

In the opinion of the writer, how the work is done is the factor to be considered most important when studying a job, for it is the method that has the greatest effect on the standard set and the productivity of the worker. It is from this point of view that Gilbreth made his distinctive contribution to the field of management, for he found that a record of time required to perform a subdivision of an operation, generally short enough and suitable for stop watch observation, was valueless unless a simultaneous record of how the work was done during that period of time, brief as it may have been, is made. Gilbreth would not stop at merely standardizing the present method with the aim of finding out how long it took to perform the operation in accordance with that method, but saw the value of studying the best worker, improving on his method, if possible, and establishing the "One Best Way" of performing that operation with due consideration to the degree of perfection the savings will permit, and to the surrounding conditions, tools and equipment available.

Which of the technics described above should be used to establish standards of performance is determined largely by the characteristics of the job to be analyzed. For example, in a machine shop operation of which the handling time is only a small percentage of the total cycle time, it may be more important to make a thorough study of the machine feeds and speeds than to make any detailed analysis of the handling operations. In this case the analyst, who should be familiar enough with motion study, can satisfactorily dispense with the handling phase of the problem, by making a brief analysis of the motions involved, without the use of the film, and set the time standards for that part of the cycle with the aid of the stop watch. The major and more important part of this cycle will be a matter of the calculation of the best speeds and feeds of the machine, and the employment of the best tools available for that work. On the other hand, if the major part of the time of the complete cycle is devoted to handling operations, it then becomes important to pay the greatest attention to the motions involved in the method. It is, of course, obvious that when a method consists entirely of handling work, a detailed analysis of it is necessary.

The time required to perform one complete cycle, or, in other words, the number of times that cycle is repeated throughout the day is also to be considered; for instance, in a cycle lasting one hour of which the handling and set-up time is but five minutes, an error of say 20 per cent in the handling time is practically negligible when the time for the complete cycle is considered.

If, on the other hand, the cycle time is ten minutes of which five are devoted to handling operations, then, an error of 20 per cent would become a serious one, especially as in an eight-hour day, that cycle would be repeated 48 times.

In highly repetitive operations, which are performed thousands of times daily and especially those consisting entirely of handling work, the study of the motions made by the worker becomes more and more important. In these cases the use of a stop watch is of little value, for with it, the analyst must work under limitations which often make it impossible for him to make an accurate study, not only of the time, but the method employed as well. The time and motion study technic employing the use of a film, the cost of which is approximately two cents per second at standard filming speed, has certain advantages over the stop watch method regardless of duration of cycle or percentage of handling time. It is possible to make a fairly accurate stop watch time study of an operation, requring a reasonably long period of time to perform, but, as the operation time decreases, the recording of the data by such a method becomes more and more difficult. Meanwhile with the motion picture method it is no more difficult to record the time of 100 motions performed in one minute than it is to record their times if performed in ten minutes. With the use of a stop watch it is not practicable to time sub-operations lasting for periods less than three or two seconds, for below this time the error made in reading becomes a serious factor. There are many operations which require the services of more than one worker, and here again the limitations of the stop watch method are removed by using the motion picture and Gilbreth clock combination. Films have been taken of groups of workers employed on the same product, but each performing different operations, many of which overlapped, and successfully analyzed as one complete job, and all the desirable results expected from the analysis of any individual operation have been obtained.

WHO SHOULD ANALYZE?

The question of who is best fitted to make the study of an operation is one that is very much discussed. It does not matter whether or not the analyst is called a time study engineer, methods research engineer, industrial psychologist, or industrial engineer, so long as he is equipped with the necessary knowledge which will enable him to make a just and intelligent analysis of the problem. Each of them must have a fair knowledge of psychology and physiology, thus enabling him to deal with the human element, and must above all have a thorough foundation along engineering lines, in order that he may analyze the work from the technical standpoint and improve the methods to the highest degree practical by the introduction of machinery whenever it is economical to do so. The psychologist cannot succeed unless he is familiar with industrial practice, designing of machinery and tools. On the other hand, the engineer's success is also limited, unless he has a practical knowledge of the human element.

The aim of every analyst, regardless of title, should be to reduce cost, increase wages of the worker and make the job easier. The results obtained will depend in a great measure upon the research ability, background and experience of the analyst. These methods of analyzing work are merely tools aiding the analyst, some of which, of course, may be better suited for certain kinds of work than the other, but the results obtained will depend upon the way in which they are used.

SELECTING THE OPERATION

Except in cases where a complete installation of scientific management is being made, in which case each operation must be thoroughly investigated and standards of performance set as a prerequisite to efficient planning, the question of what operation is to be studied first is one that very often faces the analyst. This condition usually exists in plants where the planning and control of production has not already been established in accordance with the principles laid down by Taylor, although there is no doubt that there are many plants today employing these principles in spite of the fact that no complete installation of scientific management has been made. Generally the operation to be studied is pointed at by the management for reasons such as high unit cost of production, excessive waste or failure to produce a desired quantity within given units of time. Other factors pointing to operations requiring the attention of the analyst are: fatiguing elements involved in the method of an operation, delays caused on one operation because of the slowness of another previous to that, or defective transportation system, thus delaying the arrival of material at the work place. In plants where large machines are used in production, such as paper mills, roofing plants, etc., it is always best to tackle first, the operation limiting the production of the whole unit in order that the greatest amount of service will be rendered by the machinery.

CHOOSING THE OPERATOR

Once the operation is selected the analyst must decide on the grade of operator whose work is to be studied when more than one operator is employed on the same kind of work. Many opinions are held as to who should be studied in such cases.

While some of the investigators employing the Time Study technic select the worker whose performance is somewhat better than the average, most of them consider the average or standard worker, or rather, the man whose output represents the average performance of the department as the best subject. Their practice is based on the opinion that if a standard is established using the average worker as a subject, it can be considered fair and just with respect to the performance of the other workers in the group. The slow worker will not produce fast enough to set a proper standard, while the superstandard or highly skilled worker will give a cycle time which cannot easily be realized by other workers. From this point of view, then, the superstandard worker is of no additional value to the management, other than the extra work turned out by him. This class of worker is sometimes used as a subject and allowances made for differences in skill. At this point, the technic of motion study differs greatly from that of time study for, the most desirable feature of the motion study technic is that it makes the analysis of the performance of any worker useful regardless of the method and time; provides the means of making an analytical study of the best workers; and lastly, makes possible the transfer of the composite best method to the others. The performance of the best workers should be studied, improved if possible, and the method transferred to others with allowances for the beginners, until the desired automaticity is acquired.

The time and motion study analyst, making a photographic record of a job, is not only interested in the best man from the point of view of production, but also in the worker whose method appears to be the least fatiguing. Much can be learned from this latter

type of worker, for although he may not produce as much as the best man, his method when analyzed, motion for motion, may have greater possibilities. In such cases the difference in production is very often due to strenuosity rather than efficiency.

There are many psychological factors which must be considered when the study is inaugurated in order that the coöperation of the worker be received. The methods employed by the investigator to handle this particular situation usually have great bearing on the outcome of the study. The most desirable thing to do is to make every attempt to put the worker in the spirit of research by carefully explaining to him the purpose of the study, and enlisting his coöperation to arrive at the best solution. He must not only be considered an investigator, but must also be rewarded as such by guaranteeing him the maximum earnings based on his past performance in order that his income will not be affected by the loss of production due to interruptions during the investigation. If the psychology of the situation permits, the worker should receive extra pay during the period of research and installation of the new method, for, when subjected to these conditions to which he is not accustomed, especially in connection with trying methods in which he does not have automaticity, the worker is more fatigued than usual.

RECORDING EXISTING CONDITIONS

Much has already been said about the methods used to record the existing conditions, and it has already been pointed out that it is usually most desirable to make a simultaneous record of the method and time, equipment and tools and their relation to the worker. The degree of detail with which a study may be made will depend largely upon the repetitiveness of the operation or the duration of one cycle. In cases where an operation does not consist entirely of handling work, and if the length of the cycle is such that it will make the filming of the complete cycle prohibitive, then it would be wise to make a motion picture record of the handling work only, omitting the filming of the activities of the operator during that part of the cycle in which he waits for the machine to complete its function. However, it is very necessary that we have a complete record of the operation, and this can be done quite effectively by making a process chart,[2] from the point of view of the motions of the worker in the degree of detail that may be considered necessary.

In such cases the stop watch should be used to determine the time required to perform those parts of the operation which do not appear in the film. By this procedure we will have a record of the method in process chart form and data pertaining to the time element. Although these records were not made simultaneously, as would be the case with the use of the film, they will serve the purpose for which they were made.

Aside from the film it is usually advisable to make sketches of the layout of the work place and equipment, which will be of value when the analysis is being made. Stereoscopic photographs are sometimes desirable in making the record of the job complete. A written record of the surrounding conditions, such as lighting, temperature, glare, dust, smoke, shadows, ventilation, or any other factors effecting the productivity of the worker should be made. If necessary, records should also be made pertaining to the physical characteristics, personality,

[2] Process Charts, by F. B. and L. M. Gilbreth, American Society of Mechanical Engineers Transaction, 1921, Vol. 43.

schooling and training of the worker. Any number or all of these qualties may be listed. In some work it may even be desirable to make a psychological test in order that data will be available which would enable the analyst to discover, if possible, any outstanding mental qualities in the worker-investigator.

ANALYZING DATA

It does not usually require a person of high calibre to make a record of the conditions, but, when this data is reduced to some visual form, or properly tabulated, as in the case of time studies made with a stop watch, its analysis calls for the person best equipped along the lines such as have been described in one of the foregoing paragraphs.

In establishing the standard time from a tabulated record of stop watch observations, including data relative to the time required to perform the various subdivisions of the operation as well as time lost due to delay, the investigator selects the time which, in his opinion, represents a fair performance. Some use the average time as the basis for their standard while others use the selected minimum, median, mode or geometric mean. Generally the abnormal readings are eliminated. The unusually short times are disregarded primarily for the reason that they are probably due to errors in reading, or observing. The long times also are discarded because of the probability of the worker's slowing down on account of some condition which the observer did not note when making his records.

From the point of view of the time and motion study investigator the short times, the accuracy of which is not doubted, receive more attention than others, because he is interested, not only in the time required to perform the suboperations, but is endeavoring to find the best way of doing the work. Therefore, the presence of these short times provides the means of discovering and analyzing a higher degree of skill. Quite often this difference in time is due to slight variations in the method which may not be easily noticed with the naked eye.

With the motion picture and clock combination it is possible to study a method very minutely. To do this Gilbreth revealed the existence of seventeen elements of motion (Therbligs)[3] and has shown how these elements may be used in analyzing any productive activity. When more than one cycle is recorded, as would be the case of those of short duration, the time for each Therblig in the various cycles is transferred from the film to, and tabulated on, a sheet similar to that of the time study data sheet. Continuous clock readings are recorded marking the beginning of each Therblig performed by the left and right hand. From these readings the elapsed time for each successive element is recorded. Representative cycles of each method, especially when more than one operator is filmed, are charted on Simo charts[4] which enable the analyst to visualize the duration and sequence of each element of motion in the complete cycle performed by each hand of the operators. Any useful activity of other parts of the body is also included in these visual records. Variations in the method, either due to different cycles or performance of different operators thus recorded, make it possible to select the least fatiguing elements in any part of the cycle. Motions which are apparently unnecessary are eliminated while the necessary ones are facilitated and every effort is made

[3] "Applied Motion Study," by Gilbreth.

[4] Silmultaneous Motion Cycle Chart, by Gilbreth, Management Handbook.

to reorganize the work so that the avoidable delays are eliminated and those unavoidable reduced. These selected elements are arranged in their best sequence with due consideration to the physiological factors involved and the principles of the ideal execution of hand motions[5] set down by the Gilbreth organization. From these data a synthesis of the best method is made embodying the selected parts of the cycle, the elements of which were performed in the minimum time.

Very few methods have been studied and the "One Best Way" established without the introduction of fatigue-reducing devices, such as new machinery, tools, etc., leaving the worker more effective in his efforts or eliminating motions which would otherwise be necessary. The rearrangement of tools and equipment at the work place from the point of view of the areas described by the normal arc made by the arm motions of the worker also influences the solution. These modifications present the analyst with a new condition—that of determining the time for the desirable parts of the synthesized cycle of which no accurate data is at hand, and which must be obtained through other means. However, when this new condition is fulfilled the final synthesized cycle will consist of data from various sources and which may be divided into the following classes:

a. Information taken directly from film and the time value used as recorded.
b. Modified time data of identical elements if the performance of that element is facilitated in any way that effects time.
c. Data taken from simultaneous motions of other workers in case two or more workers are employed on the same piece and the worker under consideration temporarily moves out of the picture.
d. Time data transferred from records of work of similar nature.
e. Time data established in the laboratory for the particular element for which the time required is not known, and,
f. That which is estimated on the basis of past experience on similar work.

[5] Management Handbook, Ronald Press Co.

The method resulting from the consideration of the above factors will represent the combined skill of the operators studied plus the results of scientific investigation.

In such cases as those where the proposed method represents a radical departure from the existing conditions it is important that the data included in the proposed method be accurate enough to permit the analyst to calculate the probable performance in advance in order that the worthwhileness of new machinery, tools, etc., may be determined. This must be done, for upon these data and knowledge of possible improvement will depend the amount of money that the management can afford to spend. The expenditure must be justified by the savings.

ALLOWANCES

The minimum cycle time as shown on the synthesized Simo chart merely represents the amount of time in which that complete cycle can be performed. It indicates the best performance that can be attained with the proposed method. This rate of doing work can, for a short period of time, be demonstrated by a worker who has acquired the necessary degree of automaticity in the new method, but it cannot be expected from him as an average performance throughout the day. It is necessary then to make allowances for fatigue, oiling and cleaning of machinery if not done on day rate, and other factors which are not within the control of the worker. Some of these are, delays due to breakdown of ma-

chinery, lack of power or lack of materials to be worked. Space does not permit the complete enumeration and discussion of these various factors, but proper allowances, depending upon the characteristics of the work, must be made in order that the operator can work in accordance with the standard set and can do so continuously without excessive fatigue.

PERFORMANCE STANDARDS IN CONTINUOUS PROCESS WORK AND IN JOB SHOPS

In continuous process work the standards are based on the performance of complete units. If the rate of performance of these units is within the control of the operators the standard is usually based on the average speed maintained throughout the day. On the other hand, if the speed is fixed as in case of paper making machines, then the standard of performance may be expressed in terms of number of hours they are kept in operation in proportion to the maximum within a given period.

In some of the early installations of scientific management stop watch time study standards have been compiled covering a variety of elementary operations such as "Pick up clamp", "Put clamp in position", etc. With these records of past performance the planning department can determine in advance the time required for a complete operation consisting of any number of elementary operations.

In jobbing work when the approximate time required to complete a lot does not permit a thorough analysis of the work the standards are generally set on the basis of experience with work of a similar nature. The engineer setting these standards must not only have a knowledge of the particular class of work with which he is dealing but must also have a good understanding of the principles of motion study. With such a foundation he will be able to prescribe the most effective method and determine the best layout of the work place. The method may be set down in the form of a simple Simo chart showing the sequence of the elements of motion to be performed by the hands and the time required for each. This data is given to the foreman who sees to it that the work place is set up, work started, and completed in accordance with the standard predetermined. This technic is now being successfully employed in a large New England manufactory.

TEACHING NEW METHODS

One of the most valuable results of the establishment of a best method and its standardization by means of time and motion study is the ease with which the skill represented by the new method can be transferred to other workers. When teaching the new method it is necessary to show it not only in terms of sub-operations, but it is very important that the elements of motion making up each sub-operation, their sequence and the relative times required for each, be given. Skill cannot be transferred with any degree of effectiveness unless the worker can identify the new method Therblig for Therblig. This can best be done with the aid of a motion picture of the new method as performed by the worker studied.

There are, undoubtedly, persons who learn much more quickly by seeing the new method demonstrated, while others prefer some static visual record of the complete cycle such as the Simo chart. Some would profit most by reading a description of the method written in the necessary degree of detail, while still another type will gain more by hearing about it. However, no time should be spent investigating

the individual mental differences to determine which of these means is best for each person. The information must be given in every way feasible, that is: by written instructions (instruction cards), lectures, photos, motion pictures, charts and actual demonstration, so that regardless of his mental characteristics, the worker will get it in the way best suited to him.

EFFECT OF STUDIES ON THE WORKER

Since performance standards and incentive systems go hand in hand it is important that the earnings of the worker at standard performance receives careful attention. Although the standard is set on the basis of effort its success will depend very much on the fairness of the wages paid with due consideration to the going wages of the vicinity and the many other factors consistent with good practice.

Usually, these studies result in savings of which the worker receives his share. Now, just what part of the total savings he receives will depend on his earnings before the study. If he was well paid then a small increase at standard performance will be satisfactory, while on the other hand, if the worker was underpaid, his earnings will be increased to an adequate wage. Operations on which fatigue has been reduced and on which no saving in unit cost has been made because of the output not being within his control the operator benefits by the reduction in energy required to do the same amount of work.

When a study results in a reduction in the number of workers to do a given amount of work then every attempt must be made on the part of the management to keep those workers displaced by the improved conditions on the payroll, by giving them work in other parts of the organization.

MAINTAINING PERFORMANCE STANDARDS

Once the performance standards are set and made effective, steps must be taken to maintain and keep them up to date by a periodic inspection of the methods, tools and equipment upon which they are based. The management should frequently check up these standards for the possibilities of improving them through the introduction of machinery and tools which were not available at the time the standards were originally set. An increase in volume of business with respect to a certain product will also call for the attention of the analyst to determine whether or not it is permissible to use expensive machinery which was prohibited by insufficient savings at the time the last analysis was made.

The methods herein outlined are being applied with success in analyzing productive work in the Industrial and Commercial fields. Research is being constantly carried on to maintain their effectiveness in the new and changing conditions and to broaden their scope, by engineers engaged in this work and by the Gilbreth Research Group of which the writer is a member.

Smoothing the Wrinkles from Management

Time Study the Tool

By Sanford E. Thompson

President, The Thompson Lichtner Co., Inc. Engineers, Boston, Mass.[1]

THE modern executive is appreciating the fact that time standards are of major import in management, that the manner in which these are handled frequently means a difference between profit and loss in his balance sheet and a choice between contented workmen and labor unrest.

The use of time study is spreading rapidly—more rapidly perhaps than a thorough understanding of its principles. Lack of appreciation of its importance on the part of the chief executives is leading, on the one hand, to the hiring of inexperienced young men to handle a job that requires experience and judgment, and, on the other hand, to engaging of service vendors to introduce a "system" dealing simply with the placing of a piece price upon a job without regard to its manner of performance or to its setting in the business as a whole.

The improvement of any business, whatever its nature, requires a broad treatment dealing with finance, marketing, budgeting, master planning, inventories, production control, standardization, wage determinations, and cost control. The development of time standards is only one element in the broad improvement program, an element of vital importance, but it should not be treated independently nor to the exclusion of the other elements, but from a broad conception which includes, allows for and develops all aspects.

[1] Presented before the Taylor Society, December, 1927.

Results of Time Standards

Time standards, properly developed through time or motion study:

1. Reduce labor cost through a higher and more uniform rate of production.
2. Reduce idle time of men and machines through the accurate planning made possible.
3. Maintain, insure or improve quality by aiding in the adoption of uniform and best methods.
4. Aid sales by providing accurate knowledge of labor costs.
5. Improve labor conditions and decrease turnover by giving a square deal and increased earnings to the worker.

Purpose of This Paper

This paper is designed, first, to present fundamental principles and practical methods of using time studies in the various functions of a business, and, second, to show specifically the place in industry of time measurement and job analysis as a tool of management.

It is not assumed for a moment that time study is a cure-all for irregularities in management—that its use can smooth out all the "wrinkles." In a machine shop, for example, the establishment of standards of feed and speed may precede time study to good advantage. In a pulp or paper mill, the process standards are more important than time standards and result in reduction of labor and easier performance. Time study further as-

sists, however, in obtaining and maintaining process standards. Furthermore, it is apparent that the basic principles of time analysis, that is, the consideration of the elements of any problem, whether it be in process, or machinery, or men, form the basis of our wonderful present-day developments along research lines.

Time study is often looked upon simply as a mechanism for setting piece rates. Determination of standard times for fixing incentives is of great value. Time study has, however, a still broader use, which is insufficiently recognized, and this is as a tool for the development and operation of controls, so as to know what is a standard day's work, and to obtain this standard from each machine and work place, thus reaching a maximum production from a minimum of equipment and personnel. The by-product of this is a highly productive and *highly paid* personnel. Treatment of the subject, therefore, must include these factors as well as the usefulness of time standards in fixing selling price.

TIME STUDY IN BUSINESS MANAGEMENT

The field of time and motion study and its effect upon a business as a whole is scarcely appreciated, even in the more modern plants. Illustrations in later paragraphs are of particular interest in showing what an important tool time study can be made in practical plant operation from the standpoint both of economy and labor.

The two most important uses of accurate time standards are:

1. Fixing of measures for incentives that:
   - Accurately balance different operations.
   - Insure best methods of operation.
   - Provide for ease of performance.
   - Promote uniformity of quality of product.
2. Production control where they are utilized in coördination of number of operatives with production or coördination of production with number of operatives. This results in:
   - A minimum of idle time of operatives and machines.
   - Shortest time in process.
   - Delivery of goods on schedule.
   - Reduced cost.
   - Increased earnings of operatives.

In addition to these principal uses, accurate time standards are essential to the establishment of accurate cost standards in the manufacturing of complicated products or a variety of styles.

To accomplish satisfactory results in these various features true time study must be based on certain essential principles. The so-called time study, so frequently employed, which does not follow these requirements, is entirely inadequate to accomplish these purposes.

ESSENTIAL PRINCIPLES OF TIME STUDY[2]

There are certain fundamental principles of time study analysis which are of universal application. The disregard of any one of these principles almost inevitably will destroy the value of the time study:

1. The prime purpose of time study is to enlarge production effectiveness through improved methods and thereby to increase returns to the individual worker.

[2] For complete and comprehensive information on time study principles, methods and results, see "Time Study and Job Analysis," by William O. Lichtner, Ronald Press, New York, and "Time Studies as a Basis for Rate Setting," by Dwight V. Merrick, Engineering Magazine Co., New York.

2. Time study must be practiced as a settled policy through a man or department not controlled by departmental foremen.
3. Time studies must be made always with the knowledge and coöperation of the operative observed. If practiced secretly, they are subversive of morale and futile in results.
4. Tools and machines must be standardized in advance of or in conjunction with time analysis, if such standardization has not already been accomplished.
5. Methods of performing each operation and the quality of workmanship must be studied and recorded, as well as the times. Time studies which disregard methods are of little value.
6. The stop watch should be run continuously and all delays recorded and described in addition to recording the effective times.
7. Studies must be made of the time elements of each operation, divided into small enough units to utilize them in various combinations.
8. Enough operatives must be observed to obtain fair average time standards, and before utilizing the data, continuous check production studies should be made, where possible lasting several hours.
9. A more expert handling—a more careful training, and a greater intelligence—is required for the analysis of studies and the establishment of standards than for taking the studies themselves.
10. It is important that records should be intelligible to persons other than the original recorder and that they should be available for the inspection of those interested.

These essential principles in general are self-explanatory and their importance is evident. The points enumerated are taken up in subsequent parts of this paper.

PRINCIPLES OF UNIT TIMES

As long ago as 1885, Frederick W. Taylor developed the principle of unit times. That is, the breaking up of an operation into motions or elements which can be used for re-combination into various other operations in the same way that the twenty-six letters of the alphabet in different combinations may be made to spell many thousands of words. Notwithstanding the time that has elapsed—over forty years since this discovery by Taylor—it is astounding how few time studies are made in such a way that they can be utilized properly. In other words, the vast majority of so-called time studies, even at the present time, simply record the total time of the single operation observed, with no thought of the best method, with no analysis of delays and with no recording of the elements of which the operation is composed. With this in mind, it will be of interest, after briefly discussing the present state of the art, to give one or two elementary illustrations of the practical application of unit times.

The principal illustration will be from the shoe industry. While this industry is one of the oldest in the use of incentives, and piece work is nearly universal, we venture to say that of all the shoe factories in this country, the concerns that set piece rates by any other means than guess and comparison—those who really consider the correct time for each element of an operation—number a very small fraction of one per cent. And yet it is the utilization of these unit time elements that makes it possible not only to eliminate the irregularities in piece rates, give

the workers a fair deal, and fix incentives on new styles, but it also, as we will show, provides a correct basis for determining the number of personnel for any required production and the most economical layout of work.

THE CRIME OF IMPROPER TIME STUDY

The vast majority of piece rates or other incentives, even at the present day, are set by guess or estimate. A common plan is to simply time the operations as they are going on, without regard to the method, thus neglecting the opportunity to effect large cost reductions through improvement in method and preparing the way for irregular, abnormal earnings. Another plan is to take simply over-all times without analysis into units so that new times have to be taken for every new job. Still another plan, quite common, is to time the operation very carefully into units or elements and then not use these elements at all.

In shop after shop also, even now the rates are set by the judgment of the foreman, based on approximate records or on tests under abnormal conditions, checked possibly by inaccurate times which the foreman takes from a stop watch carried in his pocket.

As an illustration of a really common method of rate setting, I was in Holyoke not long ago, talking with a young man in a paper products factory, and I asked him how the piece rates were set. He looked at me rather humorously—he had taken an industrial course at college—and said,

> Well, the foreman looks over the past records and sees what has been done on similar jobs and then he figures it up and thinks it over. He considers what he thinks he could do if he were performing the operation and then sets a rate. If the men kick like hell, then we know that the rate is right.

To show what a textile mill foreman honestly thinks is the proper way to set piece rates, I quote from an article in *Textile World* of September, 1927, entitled, "Uniform Piece-Work Rates. Studies by Foreman Result in Fair Rates." [3]

> It is not difficult to establish uniform piece-work rates. The foreman can time operations at the various machines. This is usually done by forcing production at certain machines and when production is at its height, securing the time of the operator without his knowing it.
>
> It is very important that the employes be unaware of the timing, or they are apt to slow down production, thus defeating the purpose of the timing. By using the timing process, uniform rates can be established, and every piece-worker then has an equal opportunity of making a living wage depending upon his individual skill.

No wonder, with such practices as this—and unfortunately this represents actual practice in many plants—time study is often misunderstood and condemned.

But even where the foreman does have a clear idea of what he is driving at, he simply cannot be expected to handle a specialized thing like time study or the fixing of incentives with satisfaction. Inaccuracies such as are always incident to this kind of rate setting were illustrated in a garment shop recently. The factory in question manufactures coats, and the operation of "making" was on piecework. The plant was fairly well managed. In examining the operations before making time studies to set accurate incentives and also to use in planning the work, discrepancies such as these were found: On five principal operations, the operatives worked from 77 per cent to 92 per cent of the hours they were in the plant, waiting the rest of the time. Any planning data based on earnings and hours would have been inaccurate

[3] By Harry E. Kaemmer.

in total from 8 per cent to 23 per cent, and, when the irregularities of the individual piece rates were also considered, there would be discrepancies of as much as 50 per cent.

In a plant in another industry, the piece rate on a new style was carefully estimated by an intelligent foreman. In spite of this the operative earned a little more than double the hourly rate the foreman figured he should earn. In other words, the foreman's careful estimate of the time standard was over 100 per cent high. Such estimates as these are just as likely to be wrong in the other direction.

There is another type of so-called time standardization that frequently is carried on as a fixed policy. The purpose is to set rates quickly, but it results not only in inaccurate times, but in necessity of timing the operations on every new style or part, instead of utilizing the unit times obtained by thorough analytical study to quickly set the new time. These "get rich quick" methods make no note of the method of performing the operation, make arbitrary allowance for the speed of the operator, rely entirely on judgment to fix the allowance and set up new independent times for each job.

This scheme had been in operation in a plant making machinery of complicated and diverse design requiring an immense diversity of small parts, many of them made up very infrequently. When an order for a new part came along, instead of utilizing data on file, one of the time study men would go out to the operative and take an observation on the first part of a lot which might occupy the worker from less than one to three days. From these few studies on this one man, he would set a rate, guessing at the proper allowance for rest and the variation in speed of the worker from the average. The results were, as would be expected, a heterogeneous set of times and rates, with no uniformity. For example, in checking the so-called standards, it was found that two machine parts, precisely alike but carrying different numbers because belonging on different parts of a machine, were given at different times, separate piece prices differing by 25 per cent. In other words, two identical operations were "standardized" at different times, with 25 per cent variation in the rate.

True, this type of standard setting begins to show results immediately, but it never comes to an end. On the other hand, the methods which give accurate results are simple and scientific and, taken all in all, require much less time and labor, and, as time goes on, reduce the time study work to a minimum.

A discussion of improper methods is scarcely complete without reference to certain practices of employers which fortunately are growing infrequent, of using time study for undue speeding up. As a matter of fact, in practice such purposes soon defeat themselves. On the other hand, the stop watch is an effective tool for labor coöperation, because through it, facts may be established that cannot be gainsaid. In practice, contrary to common belief, it is the workman who appreciates, even more quickly than the employer, the value to him of real time study and who can gauge the correctness of its operation.

ILLUSTRATION OF FIXING TIME STANDARDS IN A SHOE SHOP

Because of the vital importance of understanding the fundamental principles of unit times, let us take up a special case in rather elementary fashion.

The operation is one in shoe making called "hand folding." In various

parts of a shoe, the raw edge of the leather, after skiving to a tapering edge (another operation), is cemented, turned back over itself by hand, and sealed with blows of a hammer to show a neatly rounded edge. At sharp curves or angles, the edge has to be clipped or "snipped" to make the curve. In Figure I are shown pieces of leather on four different styles of shoes. One is a top, another is a tongue, a third a tongue of a different style of shoe, and the fourth is another top quite different in style.

3. *Fold*, a constant time per inch of edge to be folded.
4. *Pick*, a constant time to pick in and smooth a convex curve of 90 per cent or less.
5. *Handle*, which covers the laying aside of a complete piece and placing the next piece ready to be folded.

The following table gives the unit times on each of the four pieces shown in Figure II.[4]

Notice that in No. 1 there are only three operations, Handle, Cement and

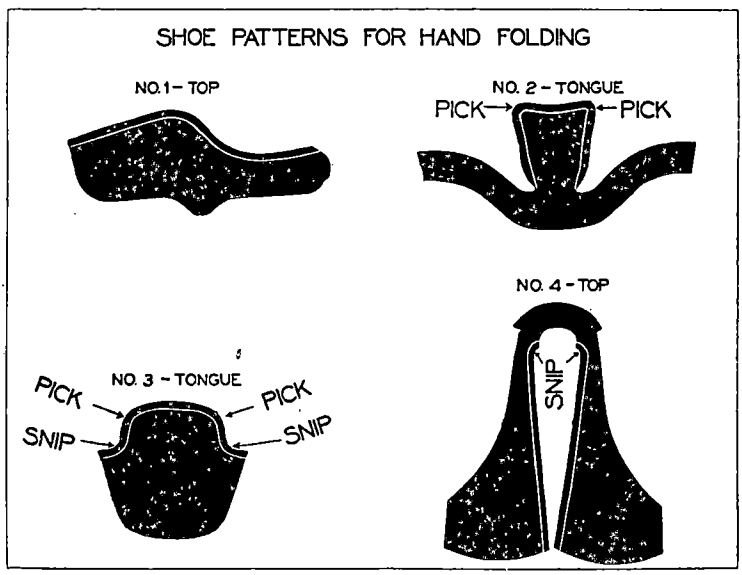

FIG. I

In making each of these varied pieces, and in fact for all hand folding, there are just five elements or units which make up the operation.

These elements are:

1. *Cement*, the time for which is taken from a standard curve made up from time study so as to give the variations in time according to the length of fold.
2. *Snip*, a constant time for each concave curve.

Fold, with a total time of 0.381 minutes.

In No. 2, we have Handle, Cement, Fold and also Pick, with a total time of 0.476 minutes. In other words, in this case, in order to get the leather round the corner, the tool had to be used to make the necessary puckers.

[4] These samples are four actual cases out of some three hundred different folding jobs in a particular shoe shop. To avoid unjustified comparison, however, the unit times have been altered and cannot be checked against actual or standard times in any factory.

STANDARD TIMES ON HAND FOLDING [4]

No. 1—Top	No. 2—Tongue	No. 3—Tongue	No. 4—Top
Minutes	Minutes	Minutes	Minutes
0.068 Cement 8″	0.062 Cement 6″	0.059 Cement 5″	0.077 Cement 12″
0.093 Handle	0.093 Handle	0.093 Handle	0.093 Handle
		0.114 Two Snips	0.114 Two Snips
0.220 Fold 8″	0.165 Fold 6″	0.138 Fold 5″	0.330 Fold 12″
	0.156 Two Picks	0.156 Two Picks	
0.381 Total	0.476 Total	0.560 Total	0.614 Total

In No. 3, there are two Picks and two Snips. In a snip the edge of the leather at the convex curve is nicked every one eighth inch, so the edge can be folded back on itself. The total time here is 0.560 minutes.

In No. 4, although there is no picking, since there is no interior corner, the total time is 0.614 minutes because of the extra length to cement and to fold.

Now, as has been said, each of these total times, and, in fact, the times of some 300 different styles of pieces, in this one shoe shop, are made up from a combination of these five elements. When a new style of shoe comes in, it is simply necessary to select from the basic curves and tables the unit time for the new shape and add the figures together. It is evident, on the other hand, that it is absolutely impossible to estimate the time for a new style from simple inspection of the piece, and yet this is the way that rates are fixed in most shoe shops as well as in many other industries. Haphazardly, either the foreman fixes the rate, without regard to the time element, or else the foreman and a representative of the

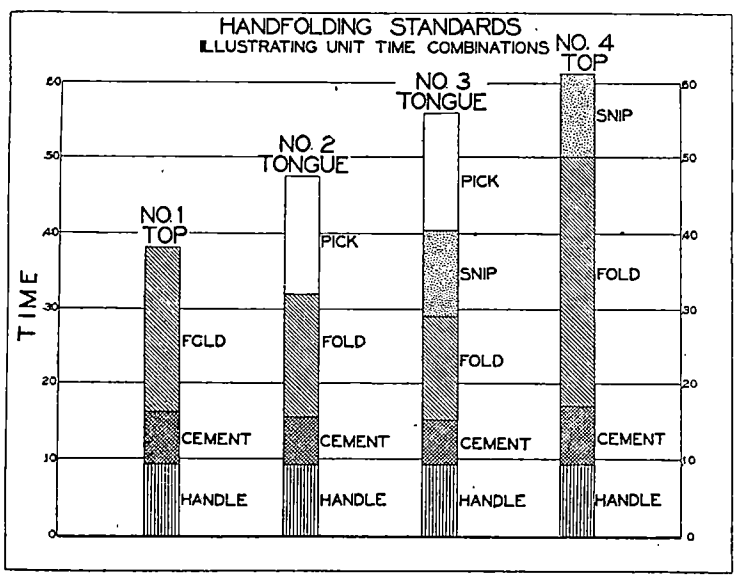

FIG. II

workmen get together and haggle over the matter.

The unit time method we have described, on the other hand, represents clearly the value of accurate time study in providing for variations in character of work and for setting incentives.

TIME STANDARDS IN PRODUCTION CONTROL [5]

The use of time and motion study as a broad gauge tool of management, as well as for the purpose of rate fixing, is only beginning to be recognized. Mention has been made of this broader use as it relates to managerial control although the treatment thus far has chiefly considered the operation of time and motion study in the determination of the standards themselves. The setting of incentives is only one of the uses for exact time standards; of equal importance are other uses in planning production so that manufacturing schedules will really fit the factory force and equipment, in determining the proper number of employes for given schedule, in evaluating quality, in developing best methods of operating and in determining labor costs to use in fixing sales prices. It is in the relation of time study to these features as well as in the use for fixing accurate incentives that its value is evident in smoothing the wrinkles from management.

The lack of appreciation, even in otherwise well regulated shops, of the time element in planning and scheduling is astounding. In our contact with various plants throughout the country, we find that most of them have certain elements of what is essentially "Scientific Management," although many would scorn to recognize it by this term. We find, for example, that many of the up-to-date shops, and especially the larger ones, have the materials well under control with running inventories substantially identical with the "Balance of Stores" originated by Taylor; we find the fundamental principles of planning the work; we find manufacturing orders made out in fair shape and a certain amount of planned control in most of these plants. Yet, in case after case there is the serious lack of this "time" element in planning. In other words, in making out a manufacturing schedule, there is practically no study made to see whether the time capacity of all important machines and men is equal to the task required.

This disregard of the time element produces a lack of coördination, which in turn causes many of the troubles which result in congestion in certain departments or work places with famine in others, in the excess or shortage of employees on different operations, in unnecessary time in process and in a consequent failure to make deliveries on schedule time. Idle time of machines or of operatives either from waiting or from slowing up the work is inevitable. This means also increase in unit costs of production.

EFFECT OF LACK OF TIME STANDARDS IN PLANNING PRODUCTION

To overcome this delay and lost time, which is particularly noticeable in plants making complicated lines of products, the time element must form an important feature in the planning of the work. The need of time standards can best be illustrated by actual examples:

CASE NO. 1.—The forge shop of a plant manufacturing large complicated machinery of many styles and types. Its specifications were well laid out; its materials under good control, but the varieties of the

[5] For a practical treatment of production control see "Planned Control," by William O. Lichtner, published by the Ronald Press, New York.

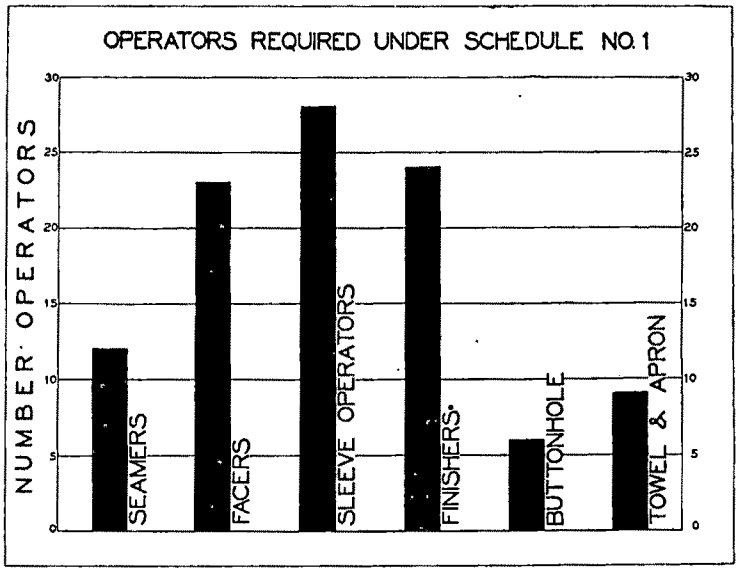

FIG. III

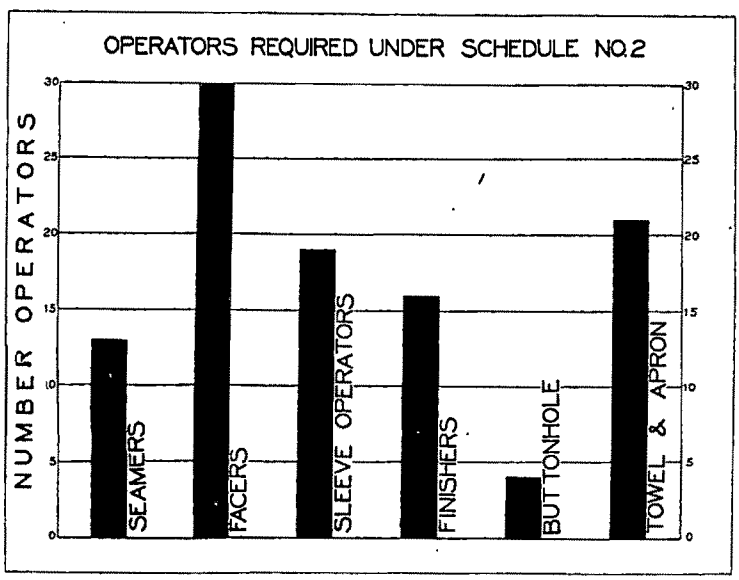

FIG. IV

different parts raised havoc in meeting schedules. In a certain schedule, for example, designed for completion in a single month, it was found that, while all right on the average, there was work laid out for one particular type of equipment to keep it busy forty working days out of the possible twenty-five. In other words, the carrying out of the schedule was a physical impossibility. This situation was entirely cured by utilizing the actual times of performing the operations in making up the manufacturing schedule.

CASE No. 2.—In another shop, the machines scheduled to be made during the first half of the month left the "eye benders" with very little work, then required twice the capacity of this equipment for the balance of the month. There was only one possible result, namely, delay in getting out the work on time, plus the natural resentment of the eye bender operators who were obliged to lose time the first part of the month and then were driven during the last half in a vain attempt to accomplish the impossible. Employes consider this pretty rotten management, and it is "rotten management."

CASE No. 3.—In a shoe shop (as in fact is generally customary) the orders were put into production as so many pairs per day, regardless of the time required on the different styles. It was found that one style required for the operation of "fancy stitching" thirty-five times as long as a certain other style (intermediate styles varying all the way between these extremes). The results were a feast and famine situation. At one time, for example, there were forty fancy stitchers. They had only enough work to keep twenty of them busy one week, while the next week, with the same number of pairs of shoes scheduled, there was enough work for sixty fancy stitchers. No wonder the operators think the management does not know its business!

COÖRDINATING NUMBER OF OPERATIVES WITH PRODUCTION

The means of correcting such situations as this, which are all too common, is through the use of time standards in planning schedules.

In the tables which follow are illustrated the manner in practical operation of adjusting, on the one hand, the schedules to the number of operatives available and, on the other hand, determining in advance the number of operatives required.

The two schedules show the number of operatives required for each operation in a garment factory for different combinations of orders.

The first column gives the different styles of coats and aprons and the second column the quantity scheduled in hundreds.

The third column gives the number of operatives per day required for the operation of seaming one hundred coats. For example, for one hundred No. 1 coats one-tenth of an operative is needed, while the total number of operatives for the scheduled quantity of eighteen hundred is 1.82, or two operatives. The other columns are carried out similarly for the other operations.

By adding the items, the total number of operators required to carry out the schedule is found.

These tables are expressed graphically in the accompanying charts. In Schedule No. 1, for example, Fig. III indicates by black lines representing the number of operatives, that in seaming, twelve operators were required, while in Schedule No. 2, Fig. IV shows that thirteen were required. Similar differences are noted in other operations. The apron and towel operators are given with the others, because the same operators make aprons and towels, as well as coats.

Comparing the two schedules, it is evident that with a constant number of employes there is necessarily a great deal of lost time. In this particular shop, before adjustment, the working time averaged 20 to 25 per cent below normal. By adjusting the schedules,

PLANNING SHEET FOR ESTABLISHING PROPER NUMBER OF EMPLOYES, BY CLASSES, FOR WEEKLY PRODUCTION SCHEDULES

Operators per 100 = Number of operators required to turn out 100 garments in a 44-hour week.
Quantity scheduled = Number of garments (in hundreds) scheduled for the week.
Total operators = Quantity scheduled multiplied by "operators per 100."

Style of Garment	Quantity Scheduled in 100's	OPERATIONS											
		Seaming		Facing		Sleeve Making		Finishing		Buttonholing		Towels and Aprons	
		Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.
Coats													
No. 1	4.32	0.101	0.44	0.292	1.26	0.264	1.14	0.225	0.97	0.056	0.24		
No. 3		0.109		0.196		0.264		0.226		0.051			
No. 4		0.111		0.193		0.264		0.226		0.051			
No. 6	6.64	0.123	1.06	0.236	2.04	0.264	2.20	0.226	1.95	0.063	0.55		
No. 8	4.32	0.113	0.49	0.244	1.05	0.264	1.14	0.226	0.98	0.037	0.16		
No. 9	43.20	0.119	5.14	0.237	9.82	0.264	11.40	0.226	9.75	0.051	2.21		
No. 11	43.20	0.111	4.80	0.193	8.35	0.264	11.40	0.226	9.75	0.051	2.21		
No. 12		0.150		0.376									
	103.68												
Aprons													
No. 1	10.80											0.058	0.63
No. 3												0.057	
No. 5												0.078	
No. 6	24.00											0.072	1.73
No. 6L	14.40											0.072	1.04
No. 11	24.00											0.078	1.87
Bungalow	6.00											0.458	2.75
	79.20												
Towels	120.00											0.010	1.20
Total operators required			11.93		22.52		27.36		23.40		5.37		9.22

Schedule No. 2

PLANNING SHEET FOR ESTABLISHING PROPER NUMBER OF EMPLOYES, BY CLASSES, FOR WEEKLY PRODUCTION SCHEDULES

Operators per 100 = Number of operators required to turn out 100 garments in a 44-hour week.
Quantity scheduled = Number of garments (in hundreds) scheduled for the week.
Total operators = Quantity scheduled multiplied by "operators per 100."

Style of Garment	Quantity Scheduled in 100's	OPERATIONS											
		Seaming		Facing		Sleeve Making		Finishing		Buttonholing		Towels and Aprons	
		Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.	Oper. Per 100 Coats	Total Oper.
Coats													
No. 1	18.00	0.101	1.82	0.223	5.25	0.264	4.75	0.226	4.05	0.056	1.01		
No. 2		0.109		0.196		0.264		0.226		0.051			
No. 4		0.111		0.196		0.264		0.226		0.051			
No. 6		0.123		0.236		0.264		0.226		0.063			
No. 8	27.00	0.113	3.05	0.344	6.59	0.264	7.13	0.226	6.10	0.037	1.00		
No. 9	27.00	0.119	3.22	0.237	6.40	0.264	7.13	0.226	6.10	0.051	1.38		
No. 11		0.111		0.193		0.264		0.226		0.061			
No. 12	30.00	0.150	4.50	0.376	11.28								
	102.00												
Aprons													
No. 1												0.058	
No. 3	12.00											0.057	0.68
No. 5	18.00											0.078	1.41
No. 6	20.00											0.072	1.44
No. 6L												0.072	
No. 11												0.078	
Bungalow	36.00											0.458	16.50
	86.00												
Towels	90.00											0.010	0.90
Total operators required			12.59		29.52		19.01		16.25		3.39		20.93

however, it was found that this lost time could be practically eliminated.

In practice, then, it is possible, on the one hand, from the standard times to quickly figure in advance how long is required for each item of a schedule (and this can be done by the unit time method, whether the styles are new or old), and thus either adjust the schedule to fit the operatives, or, if this is impossible (as it frequently is in shoe shops, because of hand-to-mouth buying), to figure in advance the number of operatives required for each daily or weekly schedule, so that the foreman will know in advance what provision will be necessary.

SCHEDULING REDUCES COST

The effect of such scheduling as this is remarkable in the reduction of cost in a department. If work is on a piecework basis, the employer frequently fails to recognize the fact that loss of operating time is costing him anything. As a matter of fact, since it is the weekly envelope that counts, rather than the price per piece, higher incentives are necessary with poor scheduling, in order that the workers may earn fair wages. Frequently, in fact, through proper scheduling, workers may receive appreciably larger earnings even with lower piece rates. Another factor of saving is in keeping to a minimum the number of indirect day workers. It was found in practice, for example, that the introduction of scheduling of this kind in the stitching room of a shoe shop reduced costs 10 per cent, with the same piece rates and without affecting the earnings of the operatives. In one case, this reduction in cost was effected by eliminating peaks of production which had been formerly taken care of by keeping an excess of day workers.

Furthermore, by such coördination of schedule, there follows naturally an elimination of waste time and a freer flow of work through the shop so as to shorten time in process and to permit the production and delivery of goods on schedule time.

APPROXIMATE TIMES INSUFFICIENT FOR USE IN PLANNING

Frequently the remark is made that this scheduling by times is all very nice, but that approximate or estimated times are sufficient for this purpose, especially when they are figured backwards from the ordinary piece rates, and even though these have the common large inaccuracies. Experience shows that this is not the case, that in order to properly balance the work it is just as necessary to work out time standards accurately as it is to secure well balanced incentives. Practically all piece rates, for example, based on past records or comparisons, contain many items which are inaccurate by more than 50 per cent. These inaccuracies throw out the entire program of the schedule.

QUALITY

Quality is improved by time standardization, and work carried on under incentives will produce better quality than ordinary day work, provided the incentives take into account the quality factor by giving special credit to the workers for satisfactory quality. In certain industries such as the continuous processes of pulp and paper mills, incentives may be based entirely on quality and maintenance of standards, with no time element entering in directly.

IMPORTANCE OF TIME STUDY IN FIXING SALES PRICES

Time study enables the accounting department to translate the normal cost per hour into a standard and accurate unit cost of product, thus

enabling the sales department to sell the product on a fairly stable and unchanging manufacturing cost. With this accurate basis, the sales department also can feel fairly well assured that these manufacturing costs are to be adhered to by the manufacturing department. Time standards insure uniform labor costs and are the means of accurately comparing different types of product. The importance of this factor is being recognized by only a comparatively few business organizations. Even at the present time, selling departments are often unable to use cost figures supplied by the costing department on account of the radical fluctuation in actual costs, due to increased or decreased actual expense and increased or decreased plant activity.

RULES FOR TIME STUDY [6]

Earlier in the paper the fundamental essential principles of time study are presented. It remains, however, having also outlined the practical uses as a tool of management, to enumerate briefly certain important details of the process of time study, the use of the stop watch, the taking of the observations, and the development of the standard times.

Organization.—Time study is a function distinct from plant operation. In a small plant one man only may report to the manager; in a large plant a "Methods Department" should be established to handle time study, rate setting, development of production control, and cost control.

Personnel.—A time study man must be competent to develop time standards and utilize these in rate setting, production control and cost computations. He must be a man of infinite patience, keen judgment, tact, and experience in business. He must have a good head for figures and be able to analyze conditions and methods of operating, suggest changes in equipment, work up the data and constructively utilize it.

Implements.—A watch is required—not like a football timer which operates entirely from the stem, but constructed so that the stem pressure simply throws the hand back to zero, while a slide on the side of the case starts and stops the hand. The dial, preferably, is divided into 10ths and 100ths of minutes.[7] This decimal system is convenient in working out results to avoid converting seconds to minutes.

Printed time sheets 8½ in. by 11 in. in size should be used. These sheets are mounted on a thin board having a projection at the upper right-hand corner to hold the watch, which should be in plain view.

Making Ready for the Study.—The period at which time study should be made is governed by the character of the work. This may fall into several distinct categories:

1. Operations such as machining, where the standardization of speeds and feeds and tools may be begun in advance of time study.
2. Operations wherein quality or nonuniformity of material from preceding processes or intermittent supplies require a delay in time analysis, until the preceding operations or departments, or the control of production, are brought into line.
3. Operations of hand, and sometimes of machine work, where the method of performing the operations can be studied coincidently

[6] See "Times and Job Analysis," by William O. Lichtner, Ronald Press, New York. Not only is time study practice covered in full detail, but numerous illustrations are given, showing the results of time study and the way to train the time study operative.

[7] The decimal dial was designed originally by the writer and first used in 1894.

with the timing, and the time or motion study data used with the recorded notes in determining the best methods of operation or process.

4. Operations such as stitching or other simple repetitive work which is of standard elementary nature and can be time studied whenever desired.

In addition to these might be mentioned operations involving process where time is not a direct element but where standards of quality and of process must be fixed by research, with little or no utilization of time study. Still another condition occurs when in starting up a new plant it may be necessary, in order to keep down labor cost, to set temporary standards by approximate studies. In such cases, if incentives are set, the operators must be informed by written notice that they are temporary and will only continue for a definite period. All this, however, is makeshift and should be avoided. It is better to concentrate on fixing accurate incentives promptly.

Selecting Workmen for Observation.—In the fixing of standards of performance, the workmen observed must be adapted to a degree representative of the average of the best group of workers available in the particular locality. These average workers must receive a fair reward, which, if gauged by measured output, must produce earnings appreciably in excess of a day wage. Exceptional workers must earn exceptional returns. Inferior workers must be trained to their job, and if they cannot attain earnings higher than the ordinary day wage, must be transferred to other jobs for which they are adapted.

Although the standards are designed for the average man, operatives for most extensive timing should be peculiarly adapted to their work. These are steadier workers (a necessity for good results) and will coöperate best and are apt to use the best methods of work. It is important, of course, that standards should be fixed from or based upon the observation of a sufficient number of operatives to obtain fair average results.

Approach to the Operator.—The coöperation of the worker observed must be gained before starting time study by interesting him in the work, getting his opinion and advice on methods and making him understand that the prime object is to give him regular work and higher total earnings.

Making a Time Study

1. Begin a period of time study with the hand of the watch at zero, but after this allow it to run continuously without throwing back between operations or operation elements. By this plan the delays may be recorded more accurately, smaller elements may be noted and a complete chronological record of the job may be made.
2. Record stops and delays. The time of each element is recorded in a vertical column and the individuals times afterwards computed in another vertical column at the right. The time of every delay and stoppage must also be recorded with the cause.
3. Timing the units. The elements of the operation must be small enough to utilize them in computing the times for new operations containing all or some of the same units. Note, for example, hand folding in shoe making, given earlier in the paper.
4. Be sure that the worker is not working too fast for the required quality of product. Bear in mind, however, that fast workers usually are skillful workers. Have

the output produced while timing inspected by a foreman or inspector to see that it is satisfactory.

5. Number of observations to take. This must be governed by the conditions of the work. If the operation occurs infrequently in practice, less attention is needed than for one (like the operation of hand folding described) in which the units are to be used constantly and in a multitude of combinations. Where there is a necessary appreciable variation in the time of the same unit more observations are needed than otherwise to properly distribute the irregular times.

   Theoretically the number of observations should be such that an equal number taken independently will not appreciably alter the average time.

   In general, a large number of observations should be made on, say, two or three operators particularly fitted for their work and a smaller number on others.

6. The number of operatives to observe. The number must be sufficient to obtain a fair average of the group. Careful studies on a few (say, eight or ten out of fifty) carefully selected as representative are better than haphazard studies of the entire force.
7. Fatigue. This is an element which in most cases takes care of itself, provided long time observations are made extending consecutively over several hours. In certain cases separate studies of fatigue are needed.
8. No so-called "Job Try Outs" are needed with the proper time study, although for psychological purposes it is best to introduce changes slowly.

Necessary Delays.—As already stated, delays, as well as effective time, always must be recorded. Sometimes, however, the delay is part of a unit, in which case the excess time over the average must be included as delay time. For example, in stitching, a thread may break in the middle of a seam. After taking out the actual re-threading, the time up to the break, plus the time to complete the seam after the stoppage for re-threading, will be longer than where a break has not occurred. Here, then, the extra time is considered to be the difference between the normal time and the observed time including the stoppage. This may be charged into the delay caused by the broken thread.

At times the observer notes as he makes the time study that the time required for an element is inexcusably long; it is then marked "slow," and the difference between it and the average normal time is thrown into the delay time.

Delays are of four kinds:

1. Necessary delays—delays in the actual operation that are unavoidable.
2. Unnecessary delays—such delays as loafing, stopping to talk, and performing extra operations not required (sometimes with the belief of the operator that he is "padding" the time).
3. Job time—the time required at the end of a job to record the job, move the work from the operator, get the next work and get ready to go to work on it, but not including the placing of the material ready to operate upon.
4. Personal needs. Having computed the average times and utilized the long time observations in which the operator is apt to stick to his work sixty seconds to the

minute and sixty minutes to the hour, there must be a period allowed for relaxation or "personal needs." For this there is no definite rule, but usually an allowance of 10 per cent is fair to add finally.

Continuous Timing.—Wherever practicable, before computing the standard times, a continuous study should be made covering several hours (from three to eight), allowing the watch to run continually during the entire period and making complete records of effective times and delays. Sometimes such long time observations can be used with advantage in making all of the time studies.

Computing Standard Times.—Taking account of corrections noted above, net unit times can be averaged directly to obtain the standard net unit time. Various other methods are used by different observers, but in practice this simpler plan of direct averages works to good advantage when used along with careful study and analysis of the conditions involved.

Summing up—the standard time of any operation is obtained by taking the sum of the net effective unit times plus actual times of necessary delays, plus the time required to change from one job to the next with 10 per cent on top of this for personal delay and rest. All the time used, except the 10 per cent personal, are the necessary elements (including necessary delays) covering that which the operator actually took under observation.

ACCURACY OF TIME STUDY

On work well standardized as to methods and employing skilled workers, the accuracy with which standard times can be fixed is astonishing. If set by the ordinary methods of past performance and judgment, variations in the earning power of the same operator on different kinds of work usually range from 25 to 60 per cent. On the other hand, when set by unit time or motion studies, as outlined in this paper, this variation is found to be actually reduced in practice to well under 5 per cent.

In other words, time study is really scientific and a fairly exact art. Of course, different individual workers on the same job do, and should produce widely different outputs. Furthermore, on jobs formerly on slovenly day-work, standards set will naturally be improved upon with increased experience of the workers, but this should not be sufficient to be unreasonable, so far as technique is concerned. However, time study men vary in their methods. Test after test, however, has shown that really skilled time study men, working by these different methods, will nevertheless attain similar standard times.

MEASURED PRODUCTION AN ESSENTIAL TO PROGRESS

To achieve advancement it is necessary to have a gauge of comparison. The scientist must have records of what has been done in the past. The business man must know what has been and what can be done. A man is measured by his accomplishments. A factory worker must be able to show his capacity, his skill, and his initiative by some method of comparing his accomplishments with others and with his own past performance.

As a matter of fact, a measure of accomplishment is essential in any line or phase of business. On the other hand, the lack of satisfactory measures is responsible for a vast number of business failures and for much of the friction between labor and employers.

This is a bold statement, but note the continuous unrest in the needle industries, due to unsystematic busi-

ness methods and particularly to ill-adjusted wage payment. Note the attempts in the shoe industry to bargain for what should be a matter of fact record. Note the constant friction in the coal mine. But note especially, those of you who employ labor of any kind, the frequent undercurrent of dissatisfaction, often kept continuously below the surface, from inequalities of earnings due to insufficient measurement of production or to inaccurate production control.

All of these facts emphasize the importance of the proper use of Time Study as a tool to correct and develop certain fundamental phases of Business Management.

Agricultural Standardization on the Pacific Coast

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THE ultimate measure of any movement of the extent, proportions, and ramifications of simplification and standardization is essentially the cumulative accomplishments of individual plants, entire industries, and various geographical divisions of the country. Each in its respective field may apply the principles of standardization in a manner peculiarly and particularly adapted to its own needs.

Volumes have been written and virtually unlimited examples yet remain to be chronicled with regard to standardization achievements of individual industrial enterprises. Economies and savings to the extent of hundreds of millions of dollars have been realized. A recapitulation of the monetary results of these efforts, of course, never will be made, but it is safe to assume that the aggregate savings, if possible of tabulation, would stagger the imagination.

Coöperative simplification and standardization, which is now in the seventh year of its sponsorship by the Department of Commerce, has likewise been given wide publicity and has had country-wide acceptance. It is doubtful if there are many industrial groups in the country which have not, at least, given some consideration to the possibilities of simplifying either their products, practices, grades, or some other aspect of their operation. Without doubt the total number of industries to some extent engaged in this coöperative standardization plan would number upwards of five hundred and of individual plants involved—thousands. Even the most conservative estimates of the potential savings from this phase of the general program probably would have to be written in ten figures.

Just as individual plants and groups of plants within a given industry find in simplified practice a means of eliminating waste and improving operating conditions, so have certain sections of the country recognized the benefits and economies certain to accrue from standardization. Nowhere has the sectional plan been so fully developed and widely applied as along the Pacific Coast—easily considered as an integral section of the country, being defined geographically, topographically, climatically and economically. While Western manufacturers singly and through their trade associations have carried out individual programs or have accepted national simplified practice schedules, the most significant contribution of the Pacific Coast to the standardization movement has unquestionably been in the agricultural field. The significance lies not alone in the results achieved but in the technique developed, in the many types of application, in the difficulties inherent in standardizing the products of nature, in the enlightened coöperation from the State Agricultural Department, and in the almost universal acceptance of the philosophy of standardization by the fruit, nut, vegetable, dairy, and grain groups.

Achievements in Coöperative Organization

In considering the technique, not the least of the Pacific Coast's contributions is the remarkable achievements in coöperative organization. This method of operation has reached its highest development in the West,

and particularly in California. The success which has attended their efforts is due largely to the fact that they have been organized and managed by business men on an intensely business-like basis. In face, a recording of the progress of agricultural standardization may be said to parallel the advance and development of the coöperative organizations in the Pacific Coast States.

Good management invariably sets out to determine the circumstances with which it is or will be confronted and then establishes a technique for meeting these conditions. Obviously any standardization of agricultural products must have for its primary objectives the protection of the ultimate consumer, the appeal to the purchasers' pocketbook, regard for the interest of the growers and packers, and finally the need of economy in administration. Certain of these objectives seemingly are directly opposed or at best indicate difficulties in adjustment; for example, the interest of the grower is in being able to market at the highest price all of his output, whereas the consumer protection demands that he be insured of a very high quality if that is what he is paying for. To market advantageously the entire crop means either the broadest classification of product or a multiplicity of grades. The first alternative on the face of it would promptly vitiate the whole effort of consumer protection; the second plan not alone is the antithesis of simplification, but introduces endless complications in the determination and administration of the standards. To compromise these difficulties, the coöperative organizations have, through agricultural, marketing, and technical research, established well-defined standards; have reasonably and practicably expanded the range of standards; have developed markets for that portion of the crop which does not fall within the higher standards; and have perfected mechanical and organization machinery for administering various phases of the standardization requirements.

The standards have not been set up arbitrarily by any group, but have been the result of experience over a period of years as to the wishes and demands of the trade as well as the performance of nature. Quite frequently growers, packers, distributors, divisions of the State Agricultural Department, and railroads coöperate in the development of certain phases of the standardization programs.

DIMENSIONAL AND QUALITY STANDARDIZATIONS

Contrary to most standardization efforts, this movement has to do largely with the quality rather than the dimensional or size aspect. It is doubtful, though, if any other industrial or sectional undertaking has applied the principles of standardization in so many ways. Dimensional standardization generally reduces the wide range of sizes or shapes of a commodity line to a workable schedule and may, in addition, provide some stipulations as to finishes or performance; in other words, introduce the quality aspect to a certain extent. Beyond that, however, this type of standardization rarely goes. With agricultural standardization, as practiced in the Pacific Coast States, standards are being developed and established to cover all of the factors bearing upon quality and in addition to control those operations or processes which influence the quality, ranging all the way from picking to packing in refrigerator cars.

THE PICKING OPERATION

Considering the picking operation, for example, it has been determined

that the fruit is very materially affected by the manner in which it is removed from the tree. Depending, of course, upon the maturity of the fruit, a picker, through careless handling, will bruise the product so as to render it unsalable when it reaches the market some days later. Particularly is this true with certain deciduous fruits such as peaches, pears, cherries, and persimmons. A picker can easily spoil fruit to an amount exceeding his wages. Then, too, an untrained worker can seriously injure or ruin the trees themselves through improper picking. Thus, certain coöperative organizations have established standard practices for picking operations, which specify the manner in which the fruit should be taken from the tree and also the kind of clippers or other devices to be used.

DETERMINATION OF GRADES

Of all the phases of agricultural standardization, that most widely applied is the determination of grades. "It is impossible to exaggerate the importance of grading agricultural products as grades are to marketing what dollars are to finance—standards of value. Just as the financial character of the goods can be measured in dollars so the physical character can be measured in grades."

Prunes

Many factors go to make up the various grades of agricultural products, and these factors naturally differ with each product. Prunes, for example, are graded on the basis of size, color, skin condition (whether broken or checked), solidity of meat, degree of fermentation, and percentage of moisture. The coöperative association has established four grades of prunes as measured by all of the above factors except size. There are nine size standards known as 20/30s, 30/40s, etc. (the number per pound) which apply in turn to each of the four grades, so that prunes are classified into thirty-six different standard grades. In this instance it is readily seen that standardization is not complementary to simplification, but rather is contrary to it. With most agricultural products it is possible to expand the standards indefinitely to incorporate all the variables introduced by the vagaries of nature. The limit, however, is determined by three factors: enough grades to insure a just return to the growers, but not so many as to complicate the distribution problem or to confuse the buyer. Certain it is that the program of the prune growers organization has dispelled the feeling that prunes were just prunes, and has built up an understanding between both growers and consumers that there are certain very distinct grades of prunes, the best of which should carry a premium over others. It is true, of course, that the housewife has no knowledge of or in fact no disposition to distinguish among some thirty-six different grades; but market and trade demands vary and no one community or store handles all the various grades.

Ripe Olives

The standardization of ripe olives has been in a fashion similar to prunes. There are seven sizes which are determined by the number per pound and designated by standard terminology. Sizes are no longer known as *fancy*, *extra-fancy*, and *choice*, but are specified as *medium*, *large*, *extra large*, *mammoth*, *giant*, *jumbo*, and *colossal*. Whether or not the latter designations are any more intelligible to the consumer is a bit questionable, but at any rate the psychology is good, as there is not a *small* size, the classification starting

with *medium*. In addition to size, ripe olives are graded on the basis of maturity at picking, color, and texture.

Avocado Pear

One of the newer fruits is the avocado pear, and in determining upon standards there was not the years of experience, recorded performance, or knowledge of consumer preference which obtained among other products. Moreover, the avocado is still a luxury among food products. Consequently the standards are stringent as to appearance and palatableness. Grades are based on size, maturity, firmness, color, appearance, shape, texture, oil content, and shipping and keeping qualities. These many variables have quite naturally had the effect of expanding the number of grades so that there is no semblance of simplification. However, trade names for the four brands sufficiently distinguish the quality so that the consumer is guided in his purchase. Similarly, for virtually all types of fruits and vegetables grades have been established which will clearly and positively classify the product.

Pacific Coast Eggs

Grade standardization, likewise, is of primary concern in agricultural products other than fruits and vegetables. Pacific Coast eggs, for example, are classed and sold on very rigid specifications. Egg standards are governed by many criteria: size, color, cleanliness, weight per dozen, size of air cell, degree of freshness, flavor, and color of yolk. Size classifications are known as *standards*, *mediums*, and *peewees*. In order to increase the marketability of a producer's eggs the coöperative association has developed a sand-blasting operation which cleans those eggs too dirty to fill the requirements of the high quality product. While this process removes the natural bloom from the shell, and also weakens it slightly, still these eggs are interiorly as good as the first quality when put into immediate trade channels. Hence some consumers are getting the nutritive and qualitative value of first-grade eggs at a lower market price.

Walnuts

Four factors influence the commercial grades of walnuts: appearance, size, fullness of kernel, color of kernel. All are amenable to classification and, to a certain extent, mechanical administration. A most interesting aspect of walnut standardization has been the mechanization of the grading operation as developed by the coöperative organization representing the growers.

After the walnuts have been picked from the ground, they are husked and then cured until they contain a maximum moisture content of 8 per cent. The crop is then taken to one of the coöperative plants where the walnuts are passed over a shaker screen which removes all dirt and other foreign matter. From the screen they pass under a suction machine which is so adjusted that the blanks or partially filled nuts are lifted over a trap, while the full-kerneled nuts pass along the belt. The next stage is a hand operation; expert inspectors stand beside the conveyor and remove stained, ill-shaped, or otherwise *cull* nuts. After this the nuts are emptied into drums where they are treated with a bleaching solution from which they are taken over another shaker to remove the excess bleaching liquid. The next step is conveying the nuts to large cylindrical graders where the size selection is accomplished. From these graders the nuts pass by workers for final inspection, at which time those improperly bleached or broken in proc-

essing are removed. The foregoing process, however, merely makes the segregation on the basis of size and appearance. To grade with reference to color and fullness of kernel, a crack test is necessary. This involves the actual cracking of a specified number of nuts taken at random from a lot. The grade requirements for the No. 1 Diamond Brand stipulate at least 70 per cent light amber-colored kernels, and 90 per cent sound, edible kernels.

There is no question that one of the greatest benefits resulting from coöperative organization has been the improvement of quality in agricultural products by means of grade or quality standardization.

SHIPPING STANDARDS

As mentioned previously, standardization has had wide application among the agricultural organizations of the Pacific Coast. The coöperative organization handling "Sunkist" oranges and lemons, for instance, has not only set up standard picking and handling practices, but has developed standard field boxes and shipping boxes—one each for oranges and lemons. The standards for these shipping boxes have been established with regard to the number most advantageously packed in a refrigerator car as well as with relation to the number of oranges or lemons to be contained. Standards have been devised also for the size and kind of tissue paper used for wrapping the fruit and the quality of paper and number of colors for box labels.

Shipping boxes or *lugs* have been standardized for avocados and grapes. The prune association has established standards for the one-pound package or carton. The organization representing certain bee growers in Washington has standardized the containers in which honey is marketed, and in addition handles the bottling of the product. Only the clear, light honey is put up in glass containers. The darker product is marketed in tin pails.

The fruit canners market four grades of product and have set up standards for the quality (sugar content) of syrup and size of cans, and have determined the minimum number of pieces for each kind and grade of fruit for each of the seven sizes of cans. In similar manner the ripe olive group has prescribed the number of each of the seven sizes of olives that should be contained in each of the four sizes of cans which they have adopted as standards.

OBSTACLES AND DIFFICULTIES

The process of standardization in any field is not without obstacles and difficulties. These are accentuated in the case of agricultural products. In this field there is not only the interest of the producer and consumer to reconcile but the whims and caprices of nature must be considered. Mother nature, insofar as Pacific Coast products are concerned, works on mass production principles, but her plants are not so meticulous in the uniformity of their output as are our industrial plants. The variations between trees, between orchards, and between seasons add complications to any attempt at standardization. Beyond all of these is the determination of when to pick so that the commodity may reach its market in the most satisfactory degree of maturity. This problem is particularly acute in the case of melons. The stage at which these must be picked varies according to the distance the product is to be transported. Melons for the eastern seaboard obviously cannot reach there in the same state of desirable ripeness if picked at the same time as melons scheduled for the San Francisco market. Again, standards

must be established—this time to govern the picking period.

In commenting on the circumstances prompting standardization of avocados and the difficulties inherent in their project, the growers' organization states that the primary conditions were:

1. extremely variable nature of avocados.
2. All avocados must be picked hard from the trees.
3. The flavor and food value of avocados depend very largely upon their maturity and oil content.
4. No one but an expert has any conception of when an individual fruit is mature.
5. The only reliable method of determining maturity is a laboratory test.

In like manner all fruit and vegetable products have their peculiar features or aspects which not only make standardization a vital necessity but difficult as well.

A further consideration is that agricultural products are perishable, varying in degree as to time, temperature, and other conditions. Because of this perishability factor, transportation must be by refrigerator cars. Here proper loading practices must be established in order that products in different stages of ripeness will be placed according to the optimum temperature areas of the cars. Coöperative researches among various interested groups are being carried on in this particular connection.

STATE COÖPERATION

Agricultural interests in California have been fortunate in having the enlightened coöperation of a capable state agricultural department. In no respect has this coöperation been more beneficial than in the many standardization programs carried out by agricultural organizations. Aside from helping to develop the standards in many instances, the Department of Agriculture has, at the request of the growers and shippers, aided in framing constructive legislation to establish and make effective these standards. Since 1915, the California statute books have carried a fruit and vegetable standardization act covering certain of the principles citrus and deciduous crops in addition to berries and cantaloupes. This legislation has been prompted with no desire to exercise inimical control over agricultural business but rather to protect and promote the industry. Those engaged in producing and marketing fruits and vegetables are well aware that the future of their business depends on retaining the good will built up in the quality and grades of California products, many of which are in the luxury rather than the necessity classification. The effect of any lowering or misrepresenting of the standard grades by any grower or shipper would be reflected in impaired markets for the entire industry. Hence the desire for legislation, the purpose of which is set forth in the preamble of the California Fruit, Nut and Vegetable Standardization Act of 1927:

> An act to promote the development of the California fruit, nut, and vegetable industry in the state, interstate, and foreign markets; to protect the State's reputation in these markets, to establish standards and standard containers for certain fruits, nuts, and vegetables specified herein, and to prevent deception in the packing, marking, and sale of fruits, nuts and vegetables, to prescribe penalties for the violation of the provisions hereof. . . .

This act accurately sets forth the standards of grade, containers and markings for: oranges, lemons, grapefruit, dates, grapes, apricots, avocados, berries, cherries, peaches, pears, ori-

ental persimmons, plums and fresh prunes, pomegranates, quinces, walnuts, artichokes, cantaloupes, carrots, head lettuce, melons, onions, potatoes, sweet potatoes, and tomatoes. As the agricultural industry develops and as the experience grows, the growers and shippers request the legislature to amend these laws, always with a view to strengthening their provisions and bringing more products under their regulations. This strengthening of legislation is not as utopian as it may sound as the standardization act stipulates minimum requirements below which it is illegal to sell and already many organizations adhere to standards substantially higher than those set by law.

A further movement in the direction of state coöperation is the certification service established by act of January, 1927. This legislation provides that, upon payment of a fee, agents of the State Department of Agriculture may inspect and certify as to grade standards of any shipment of produce. This obviously facilitates negotiations between growers, shippers, or others financially interested.

RESULTS

Now what have been the results of this intensive program of agricultural standardization and supporting legislation? Certainly, a portion of the credit for the general prosperity of California agriculturists and the tremendous growth of the industry may be directly attributed to these standardization efforts. In thirty years the production of fruits alone has increased twenty times; the shipments of California fruit and vegetable products last year amounted to approximately 300,000 carloads with a value well over half a billion dollars. Despite the immensity of this output, its transportation, distribution and disposition must be accomplished with the greatest facility. To begin with, the center of the markets for these products is twenty-five hundred miles distant; then there is the perishability factor to contend with; in addition there arises the difficulty incident to handling peak loads on the transportation systems and in a few congested terminals (more than half of the Pacific Coast products goes to the New York, Boston, and Philadelphia areas); and finally the fact that the season for certain of the products is very short.

In what way, then, has standardization expedited the handling of these agricultural products, which is of such paramount importance? Grade standards, first of all, establish a basis of negotiation thus obviating lost time in bickering and quibbling over values. Second, grade standardization insures the shipment of those particular grades which are demanded in certain markets —the old example of brown eggs for Boston and white eggs for New York. Third, off-grade produce is culled at the origin so that the time and cost of handling, transporting and disposing of it is saved. Fourth, container or shipping box standardization provides a unit pack which is easy to handle, which is a desirable unit for marketing purposes, and which is designed to afford maximum loading in cars.

Aside from facilitating marketing, produce standardization aids financing in that loans can be made on graded warehouse receipts. Grade standardization has furthermore been an important factor in enabling Pacific Coast products to compete with foreign produce. In at least one instance, that of dried figs, a standardization of cultural, manufacturing, storage and merchandising methods saved an industry which three years ago faced practical destruction. A direct cost reduction, in a direction not ordinarily

witnessed, was realized as a result of standardizing egg grades. Large buyers were in a position to purchase with assurance on the producers' standards, thus obviating the necessity of recandling, or otherwise inspecting the eggs. This lowered the handling costs to a point where merchants were able to operate on a seven to nine cent margin instead of a fourteen to fifteen cent margin.

Crate and box standardization allows the manufacturers of these containers to operate on mass production lines and hence to produce for stock during slack periods. The benefits ramify widely.

As for the ultimate consumer, whose interests are of primary concern, quite certainly he has benefited immeasurably and in many ways. If simplification and standardization have any merit or objective at all it is in reducing costs. That this objective has been realized in the case of the purchaser of agricultural produce from the Pacific States can be supported by facts and instances no end. Moreover, equally important to the consumer is the assurance that he is either getting what he pays for or has a positive basis of recourse. Benefits to the consumer are manifested in the direction of service, quality, appearance, and other appeals and conveniences.

As a final remark, it may be safely stated that whereas standardization of the agricultural output in the Pacific Coast States has not been a panacea for all of this industry's ills, nor is it a pet nostrum of snake oil propensities, yet it has been one of the most significant aspects of this industry's development. From the various examples cited, it has been shown that virtually any phase of this agricultural operation is amenable to standardization and hence intelligent control.

Intra-Plant Standardization

By Paul E. Holden
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NOTHING quite so completely epitomizes the philosophy of present-day production as the one word, *specialization*, which in turn connotes standardization. The efforts, progress and results of the broad co-operative movement of simplification and standardization, guided and sponsored by the Department of Commerce, have been widely disseminated and generally endorsed. That this national program for the elimination of production waste is probably the most outstanding industrial achievement, from a dollars and cents standpoint, in the last decade, is largely recognized.

Manifestly this coördinated plan, which is based on the coöperation of all or a large proportion of an industry, has its limitations—it cannot, for very obvious reasons, encompass the vast field of application open to the individual manufacturer. So despite the tremendous savings accomplished in this nation-wide effort, many individual plants have not as yet made the most of the possibilities afforded by intelligent intra-plant standardization. In the first place, conditions within a given plant are so individual in many respects that a coöperative standardization would be utterly impossible. Secondly, the more intimate details of operation and management are matters over which the individual plant must have full control and in which the highest individual ingenuity must be allowed to operate.

It is evident, therefore, that the individual manufacturer has an infinitely greater opportunity to secure the many benefits and economies of standardization than is possible solely through the coöperative movement within an entire industry. In fact, the possibilities run virtually the entire gamut of factory operation. A few of these possibilities together with the manner in which certain manufacturing concerns have handled them are set forth in the following paragraphs:

Materials

Most plants make some attempt at a standardization of the raw materials and supplies which they fabricate and use, but relatively few have actually developed a set of material standards with sufficient thought and study to realize the full benefits of such an effort. Too often the entire question of materials and supplies is left solely to the purchasing agent, who, likely as not, has but a limited technical background and, therefore, only a very general appreciation of the manifold factors involved in the selection of the best materials or supplies for a specific purpose. On the contrary, it is not uncommon to find the idea of specialization of materials carried too far, with the result that inventories are much higher than need be or would be, if a thorough study were made to adjust conditions so that one size and specification would serve amply the purposes of several uses of relatively the same requirements. That an effort to simplify materials and supplies will bring results is indicated by the experience of two of the country's largest railroads. The Pennsylvania Railroad eliminated 44 per cent of the items carried in stores, making a reduction of from 140,000 to 78,000 items; the Union Pacific Railroad made a 46 per cent

reduction in the number of items carried in stock and promptly released $18,000,000 tied up in stores inventories.

One large manufacturer of machinery had an extensive survey of his material requirements conducted by a committee composed of representatives of the production, engineering and purchasing departments. Included in their analysis were steels, non-ferrous metals, textile fabrics, leather, wood products, lubricants, fuels, and chemicals. As a result, not only were the varieties of steels reduced from 73 to 38, as an example of simplification, but, for each item, standard specifications were drawn covering composition, physical properties, dimensional standards, dimensional tolerances, cutting lengths and variations, finish, weight tolerances, supply instructions, inspection provisions and tests. Moreover, good commercial specifications were adopted wherever possible, rather than stipulating highly special requirements.

With concentration on fewer varieties of materials, the purchasing department is obviously in a better position to keep in touch with market conditions and also to place larger, though fewer, orders thereby receiving the benefit of lower prices and larger discounts. Furthermore, there is not the likelihood of a sudden depletion of a certain raw material or supply with the resultant temporary shut-down until stock can be replenished—a situation which is more serious where specifications are unusual or peculiar to the particular company. Material standardization likewise removes certain manufacturing hazards. The production department, when assured of a standardization in the quality of the raw materials to be processed, is protected against the receipt of off-standard stock likely to lengthen machining times, cause heavy tool breakage and increase production costs. Heat treating operations are facilitated and losses due to improper temperatures are reduced to a minimum by constant qualities of raw materials. Bonus or piece rates are not subject to criticism by the workers when the machineability of the materials reaching their operation is constant rather than alternatingly good and bad.

Thus it is patent that a standardization of materials and supplies results in benefits ramifying throughout the entire plant.

EQUIPMENT

Plant equipment includes everything with which the employees are to work: machinery, tools, dies, jigs, fixtures, benches, chairs, belts, trucks, tote-boxes, etc. All are amenable to standardization.

It is not difficult to assay the advantages of machinery standardization and yet countless plants are equipped with a collection of machinery which would do credit to an industrial museum. Unquestionably, for every production operation, there is some size and type of machine which is better adapted to the purpose than any other. To determine which machine would best do the work is, of course, not accomplished through grab-bag procedure, but neither is it by high-powered salesmanship. Intelligent study of the field, with perhaps a reasonable amount of experimentation, should, in the vast majority of cases, indicate the proper machine, and where a number of machines are to be put in operation on the same, or similar work, a standardization on this one type is of inestimable value.

To begin with, the purchase of a number of units from one manufacturer would doubtless carry with it a sizable discount. Then the question of repairs is greatly simplified and service facili-

tated. Through complete interchangeability, emergency repairs can be made by taking a part from a machine which may be temporarily idle. Then, too, it is often necessary to shift operators from one machine to another due to various causes, but the usual resultant slowing down is obviated with standardized equipment because of the workers' familiarity with the particular type of machine. This same familiarity speeds up the work of the set-up men who are skilled and therefore highly paid workers. Moreover, machinery standardization is applicable whether for special and single purpose machines or general purpose machines.

Going a step further, tools and fixtures likewise can be thoroughly standardized with dollars and cents results. Most of the same economies will accrue as with machinery standardization—interchangeability, better service, familiarity of operators and set-up men. Tool-room operation is correspondingly simplified as regards the issuance, storage, maintenance, design and making of tools and fixtures.

In like manner, and with comparable results, benches, chairs, desks, trucks, tote-boxes, and all the other shop equipment can be profitably standardized.

The benefits from equipment standardization extend beyond the factory divisions. The purchasing department, for instance, can place orders for standardized machinery and tools with much less clerical and other effort. The diversity of selection open to purchasing agents may be indicated when we note, for example, that the manufacturers of grinding wheels, although accomplishing a 64 per cent simplification, still offer 255,800 varieties. What is true of grinding wheels is also more or less true of many other tool and equipment lines, so that equipment standardization is a very worth-while effort from a purchasing standpoint alone.

PROCESSES

Using the phrase, popularized by the late Frank B. Gilbreth, there is a "one best way" of performing every productive operation and a one best sequence of these operations as constituting a manufacturing process. Such a statement sounds trite, but relatively few plants have any assurance that the same parts from day to day are being processed in an identical way and in a way, moreover, which has been proven the best.

In a steel mill, the process of making certain laboratory analyses on a heat of steel is standardized and the consequences of any hit-or-miss methods are well known and no detailing of them is necessary here. Yet, losses daily result and go unheeded in plants due to a lack of uniformity in manufacturing processes equally vital. Such losses take the form not only of production inefficiencies, but reflect themselves in the quality of the final product. A company can have no greater asset than high quality consistently maintained.

The advantages of process standardization take on added significance when a concern operates a number of plants throughout the country producing the same line of products. Here headquarter's supervision of quality and productiveness is remote and assurances of high standards of both can be accomplished only through complete uniformity of processes. Such a case is represented by a company manufacturing heavy machinery in some forty or more plants well scattered geographically. This concern, through a committee of plant engineers, has developed and put into practice standard processes for enamelling, die casting, heat treating, rust proofing, painting, varnishing, pickling, kiln drying,

etc. As a consequence a similar unit produced by any one of the plants is identical in every respect and the productive efficiency of the various branches is maintained. The principle of process standardization has been extended by this company to its various design departments and a complete set of designs practices has been developed. As typical of these may be cited—factors of safety, running fits, tolerances, bearing pressures, bushing proportions, lubrication, dust proofing, methods of rating, methods of guaging, spring design formulas, working stresses, taper fits, etc.

CONDITIONS

Probably no phase of standardization is more productive of results than that which provides for identical circumstances under which a workman performs the same operation. It was Frederick W. Taylor who first pointed out the importance of this principle of scientific management. To quote:

> Each man's task should call for a full day's work, and at the same time the workman should be given such standard conditions and appliances as will enable him to accomplish his task with certainty.

Standardizing conditions involves certain of the previously mentioned applications, such as materials, machinery, tools, fixtures and methods, and, in addition, such factors as light, heat, ventilation, speeds and feeds of equipment. Obviously, no operator can daily turn out the same quantity and quality of work if, for instance, the materials which come to him are variable as to machineability, dimensions or finish. Neither can he consistently deliver full production if the belts on his machine are not properly tightened or if the tools, dies, jigs, or fixtures are not sharp and adequately maintained. Moreover, it is not likely that day to day output will be the same if there has been no definite standardization of processes—the sequence of operations being left entirely to the ingenuity and memory of the workman.

Similarly, no operator, regardless of his loyalty and desire to render a full day's work, can produce the same quantity and quality of work if on dark cloudy days he is working under half the illumination intensity he experiences on clear days; or if the temperature at his place of work is 65° one day and 45° the next; or if on one operation the smoke or dust is completely removed and on others no exhaust or ventilation provisions are made; or if on soft materials the machines are geared to feed and operate at the same speed as for harder materials.

All of these conditions have a positive influence on the productiveness of a plant and its workers; all are controllable, and all amenable to standardization.

COMPONENT PARTS

The principle of component parts standardization has perhaps been more generally applied than any other phase of the whole range of standardization possibilities. It is difficult to conceive of any plant manufacturing an assembled product not being in a position to bring about some standardization of the parts which go to make up the final product. Trade conditions may make it necessary to have a diversified line, but such a situation does not preclude the possibility of a standardization of component parts and sub-assemblies. In fact, an analysis of the several thousand parts going to make up the various models of automobiles produced by any one of our large manufacturers would reveal an astonishing degree of standardization and interchangeability. According to the General Motors Corporation, approximately 70 per cent of an automobile is composed of so-called minor parts.

In their plants the number of these were reduced from 13,000 to 2,100 with a resultant decrease in the manufacturing cost and a greatly simplified service problem.

What is true of the automotive industry likewise obtains in other lines. A manufacturer of kitchen cabinets produces nine models and sizes, but 75 per cent of the component parts making up these nine models are standard and interchangeable. Farm implements apparently afford ample opportunity for parts standardization in view of the accomplishments in this direction achieved by two of the largest producers. For example, Deere & Company found that for every newly developed machine a special seat was being designed until a sizable array of dies and other tools for making these seats was tieing up considerable investment. Now every piece of machinery, whether a plow or a corn planter, is equipped with a standardized seat. Levers, latches, single trees, chains, brackets, springs and similar machine elements are likewise standardized.

To overcome this same and natural inclination of designers, a concern producing optical instruments set up in their drafting department, a board on which were mounted samples of the more common and less significant parts going into their products. In the development of any new model, the designer is instructed to concentrate his attention on the more important parts and for such items as thumb screws, hand wheels, ratchets, and the like, to make his selection of one of the samples displayed. Samples, moreover, for which materials and complete sets of tools and fixtures are already on hand.

FINISHED PRODUCT

The results possible from standardization of the completed product have been so thoroughly broadcast that a discussion here would be reiteration. However, many manufacturers are in industries which do not lend themselves particularly to coöperative simplification and therefore must apply the principles individually. The various style lines might well be cited as an example, and many plants in this field have found it profitable to follow a reasonable standardization of their products. A manufacturer of men's hats was able to eliminate 60 per cent of his 3684 varieties and at the same time virtually do away with the pronounced seasonal operation of his plant. Moreover, he was able to do a $4,000,000 annual business on a $176,000 inventory in contrast with a previous $1,600,000 business on a $500,000 inventory, thus increasing his capital turnover from 3.2 to 22.7 times per year. With similar results a manufacturer of men's clothing standardized 24 styles of blue serge suits out of his previous line of 1000 styles, thereby reducing overhead costs 50 per cent, increasing sales from 30,000 to 60,000 suits annually, and extending the annual production period of his plant from thirty-six to fifty-two weeks. In shoes, underwear, and even ladies' hats, definite progress has been made by certain companies.

Thus to the individual manufacturer, regardless of the nature of his industry and the articles he makes, is open the opportunity to establish standards for sizes, colors, finishes, grades, and brands of his finished product.

CRATES AND CARTONS

The opportunities to effect savings in this aspect of the standardization program has escaped the attention of many plants. To be sure the results will not likely be as spectacular as those due to other efforts, yet some very real economies can be achieved.

Most plants have given consideration to the sizes of crates and cartons which most satisfactorily house their products. Due regard to lumber conservation has been considered also, and dimensioned lumber or box shooks are purchased by many concerns.

It is the exceptional plant, however, which has studied the science of packing to any appreciable extent—determining the thickness and spacing of slats in a crate to give the necessary strength with a minimum of lumber; studying the correct placing of braces to render maximum resistance to breakage; ascertaining the proper size and spacing of nails to securely fasten the crate together with as few nails—and the necessary labor to drive them—as possible. A technical discussion of the field of standardization in the packing and shipping room is not possible here, but suffice it to say that exhaustive researches have been carried out by the Forest Products Laboratory located at Madison, Wisconsin, from which data is obtainable.

TERMINOLOGY

Of all the avoidable wastes occurring in the normal manufacturing establishment, none is more insidious nor more stupendous than that due to misunderstandings or lengthy directions resulting from a lack of standardization of everyday plant terminology. The same department, operation, machine, tool, or part, usually goes by several different names or designations. Even when there is some uniformity of nomenclature, redundancy is usually the case, and time incalculable is unnecessarily consumed in giving directions, preparing shop orders, and keeping plant records under such conditions.

No industrial waste on the other hand is subject to treatment with less effort or expense. Much of the lost time can be entirely eliminated by nothing more than a well developed system of symbolization and classification. Departments, processes, materials, machinery, tools, supplies, operations—all can be readily identified, easily remembered, quickly designated, and promptly recorded by a simple scheme of symbols. Several well known and successfully applied systems are available in book form, but in lieu of a readymade system, a series of symbols can be adequately devised by any plant to serve its specific purposes and suit its own requirements.

The foregoing phases of intra-plant standardization are but typical of what manufacturing concerns are doing and will be merely suggestive to the production executive wherein the technique of standardization may be applied. Furthermore, what is true for shop practice is equally applicable to office operation.

Office supplies, typewriters and similar machines, desks, tables, chairs, file cabinets and the forms and records which they house, clerical operations, routines, functions, conditions and terminology are all subject to standardization. Moreover, these afford opportunities for savings and economies comparable to those effected in the production divisions of a manufacturing enterprise.

As a closing statement I think it is safe to say that while the philosophy of standardization has had wide acceptance among business executives, the virtually unlimited opportunities for applying its principles have not and are not being fully realized in most of our industrial and commercial institutions.

Standardization at Cronk and Carrier Mfg. Co., Canton, Ohio

By F. A. SCHMIDT
Swineford Division of the Cronk and Carrier Mfg. Co.

It was desired to include in this volume an illustration of standardization throughout a medium-sized plant. This article concerning the standardization work of the Swineford Division of the Cronk and Carrier Mfg. Co. fills this need. The Cronk and Carrier Mfg. Co. is composed of three divisions: Montour Falls, Potter Department and Swineford Division at Canton, Ohio, formerly the G. A. Swineford Company. This article relates to the standardization work at the latter plant. The product of this company includes steel goods, pliers, pruning shears, garden sets, snow shovels, tools, hedge shears, trowels and haying tools.—EDITOR.

STANDARDIZATION means fixing the nature of an object, the procedure of an action or the status of a relation. Its application is continuous and progressive in the same degree as times and human conceptions and conduct change. But that which has been standardized is considered fixed for the time being for the practical purpose of dealing with it as a definite value. A thing in process of change cannot lead to a definite conception, and consequently cannot be entered into a calculation for desired facts.

In the first instance, therefore, management aims to operate with *definite* values, and only in the second instance does it strive for the *highest* and *best* values obtainable. Thus, all management is essentially a process of standardization in the sense that it first establishes all items, and then, by being able to evaluate them in relation to the general action, it raises and enhances them to suit a projected improved process.

There are certain basic standards of scientific fact, such as numerals and units of measurement, which may be regarded as *final standards* and which apply universally. In our discussion of *standardization* at the Cronk & Carrier Mfg. Co. no claim is made for any development of this scope, and our conception of *standardization* is fixed at the narrower limit of the individual problems of our particular industry.

We propose to distinguish between (A) standardization of material, (B) of operations and (C) of tools, although the development is interrelated and is depending on a succession of simultaneous steps in all three departments.

A. STANDARDIZATION OF MATERIAL

In standardizing material we fix its name, its weight and measure, its cost and its quantity.

The first step is a classification assigning to each article a symbol which definitely establishes and describes it and eliminating the old confusion of many different names. Further, by asserting the relationship of all items, our *classification* accomplishes the work of correlating them once for all which otherwise has to be repeated incessantly. Our material classification is divided into four groups: product, product stores, general stores and worked material.

The product classification is a list of the finished product, identifying main groups by a first symbol, a sub-group

by a second symbol, and the specific article by a number.

To illustrate:

H F 75
In which H means group hay tools
F means sub-group hay fork
75 means hay fork No. 75

For complete list see illustration No. 1.

The product stores classification concerns raw material on which *no* work has been done in the plant, and which is kept in stock specifically for one only product.

To illustrate:

HF 75 MI B
In which HF denotes group
75—specific product
MI—malleable iron
B—drawing mark B, meaning the BARB

CRONK & CARRIER PRODUCTS AT CANTON

D—DIGGING TOOLS
DD—*Digging Bars*
DD—700
DD—710
DP—*Post Diggers*
DP—603
DP—604
DP—605
DP—606

H—HAY TOOLS
HC—*Cars and Track*
HC—4
HC—5
HC—20
HC—25
HC—30
HC—40
HC—45
HC—55
HC—60
HC—65
HC—70

HF—*Hay Forks*
HF—75
HF—80
HF—81
HF—85

HS—*Hay Slings*
HS—95
HS—96
HS—97
HS—98
HS—99

HK—*Hay Knives*
HK—300
HK—305
HK—310
HK—315

HP—*Hay Fork Pullies*
HP—104
HP—105
HP—111
HP—112
HP—113
HP—133
HP—135
HP—145
HP—150
HP—151
HP—155
HP—156
HP—157
HP—165
HP—166
HP—167
HP—168
HP—170
HP—171
HP—175
HP—178
HP—179
HP—180
HP—185
HP—190

L—SHOVELS, CLEANERS
LA—*Sidewalk Cleaners*
LA—375
LA—380
LA—500
LA—505
LA—507
LA—508
LA—551
LA—552
LA—550

LS—*Shovels, Scoops*
LS—350
LS—355
LS—360
LS—1360
LS—365
LS—1365
LS—385
LS—1385
LS—390
LS—1390
LS—395
LS—1395

R—RAKES
RD—*Wood Lawn Rakes*
RD—205—22
RD—205—25
RD—205—38
RD—210
RD—211

RR—*Wire Lawn Rakes*
RR—213
RR—214
RR—215
RR—216
RR—220
RR—234

NR—*Mop Wringers*
NR—900

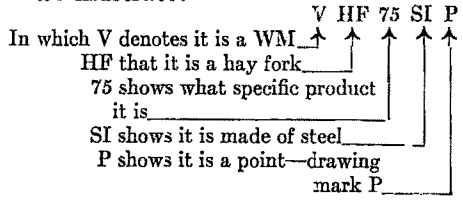
PRODUCT CLASSIFICATION—ILLUSTRATION NO. 1

The product store is identified by a letter added to the product symbol (identical with a drawing mark), and is prefixed by CI when it is cast iron, MI when malleable iron, SI when it is steel, and is not thus prefixed when consisting of material other than either cast iron, malleable iron or steel. The product store classification is used to identify the patterns as well as dies, jiggs and tools, and constitutes, therefore, a standard for our records.

The general store classification concerns raw material in stock on which no work has been done in the plant, and which may be used for several, or all the product. It is material mostly purchased in the open market as *standard* makes, such as bolts, rivets, bars, nails and so forth. General stores are prefixed by the letter S.

The worked material classification includes all material stored, on which work *has* been done in the plant, and which is kept in readiness for assembly into one or more products belonging to one only product group. It is identified by the letter V in front of the symbol which is otherwise the same as for the product store.

To illustrate:


V HF 75 SI P
In which V denotes it is a WM
HF that it is a hay fork
75 shows what specific product it is
SI shows it is made of steel
P shows it is a point—drawing mark P

From the foregoing, it is evident that a product may be composed of product stores, general stores or worked material, depending on the nature of the article as well as on the *standardized* process of manufacture, which decides what parts shall be carried as stores and which as worked material. This is a most important junction of standardization of material and standardization of operation, to which we shall refer later.

The above grouping of material into products, product stores, general stores and worked material facilitates the standardization of weights and measures, as the specifications for each class are fundamentally different. Thus, for *product*, the item of finish and appearance is particularized, for the *stores* the weights and dimensions are essential, while for *worked material* the workmanship and degree of precision for interchangeability are the keynotes. In standardizing the weights and measures of the stores and worked material, we largely effect the standardization of the finished product itself.

The *unit* in which material is to be considered is made standard, that is, it is decided whether it is to be carried as pounds, pieces, feet, board feet, tons, barrels, bales, dozens, gallons, gross or hundred weights.

On basis of this unit standardization the weights are fixed. Other specifications, down to chemical analysis, differ widely as to their minuteness in accordance with the practical requirements of control, rather than abstract scientific fact.

Examples: Steel sheets for shovel making are standardized as to dimensions: 48 x 120 and 40 x 120 x .0625 gauge, tolerance 3/1000th over or under .30 carbon. They are bought in App. 20 ton carload lots, which are the basis for job lots, in which the entire carload is often scheduled to move on to finished material, from a standard unloading to standard finishing operation.

Castings for RR214 lawn brackets (RR214MIC), weight .45 pounds sandblasted and not tumbled, with standard handle socket core and standard head cores at right (90 degree) angles to one another.

Bars for HF75 hay fork points (VHF75SIP) are standard in $\frac{7}{8}$" x

¼" x 16'υ" sizes, .20 carbon, suitable for welding. Size permits cutting without waste. Ordered in mill quantity, special analysis, minimum one ton.

The standardization of *material cost* is relative to market conditions and special purchase contracts, in so far as the stores are concerned. Standard manufacturing cost on worked material and finished product is an average of past performance, and is established on our cost cards. They constitute a guide line for comparisons and form the basis for fixing the selling prices and the general business policy. These cost standards are computed through our general accounting and cost keeping system, and, of course, are the result of the standards of all details. They are the most vital single issue of what we conceive as: *standards.*

The standardization of the material quantity is effected by determining the minimum quantity to which the inventory is allowed to decrease on basis of a sales analysis, and by fixing the ordering quantity in which material is to be purchased or manufactured on basis of the most economic production lots. These standards are carried on the balance sheets.

B. STANDARDIZATION OF OPERATIONS

The standardization of operations deals with the establishment of the manufacturing process in its entirety, with the process of fabrication of each product, and, finally, with each operation required to do the job.

As we are producing a variety of products of which different groups are made in different seasons, a certain cycle on basis of the calendar has been evolved with the view of distributing the working load as uniformly as possible over the year. Thus, lawn rakes are made in October, November and December, hay tools in December, January, February and March. In April and May an interseason prevails during which worked materials for all products are made for stock. June, July, August, September and October are the months in which the shovels, scoops and other winter goods are made.

The process of fabrication for each product is standardized in our product analysis sheets or route sheets. (See illustration No. 2.)

Here a primary bill of material distinguishes between stores and worked materials for each product. For each worked material in turn, a secondary bill of material distinguishes between stores and worked materials, and so on, until each worked material is reduced to its stores.

Now under each worked material so evolved we list the operations required to convert its stores. It goes without saying that there are stores on which work will be performed, and which in succeeding assembly operations will be incorporated directly into the finished product without ever being stocked as worked material. It is at this point where the standardization of process and standardization of material are simultaneous. The consideration of process economy decides whether a material should be stocked after some work has been done upon it, or whether it should be left in process until finally assembled. It is also at this point where the development of production methods and detail operations have to advance before the standardization of each process can be accomplished.

The standardization of each operation required to do the job is essentially based on time study, and is established on detailed instruction cards. (See illustration No. 3.)

These standards are summed up in a single figure denoting number of pieces per hour, and are the basis for a bonus

PRODUCT HF 75

STORES	WORKED MATERIAL
2—HF 75 MIL	1—VHF 75 SIA
2—HF 75 MIB	2—VHF 75 SIP
2—HF 75 CIH	2—VHF 75 SIC
	2—VHF 75 SID
8—SR 5/16 x 1 5/16	
8—SR 5/16 x 5/8	
2—SR 5/16 x 1 5/8	

VHF 75 SIA		VHF 75 SIC	
1—HF 75 MIR	0	2—SA 3/16 x 7/8 x 17 1/2	0
1—SR 3/16 x 1 1/8			
1—SA 5/8 x 7/8 x 24"			
VHF 75 SIP		**VHF 75 SID**	
4—SA 1/4 x 7/8 x 30"	0	2—SA 3/16 x 7/8 x 22"	0

OPERATIONS

VHF 75 SIA			VHF 75 SIC		
1. Cut	MS	1—300	1. Cut	MS	1—400
2. Insert ring	MN	2—100	2. Punch	MS	1—220
3. Bend	MB	—100	3. Shear round	MS	1—350
4. Drill	MD	1— 30	4. Ctsk	MD	1—310
5. Swedge	MP	2—400			
VHF 75 SIP			**VHF 75 SID**		
1. Cut	MS	1—140	1. Cut	MS	1—400
2. Punch	MS	1—140	2. Punch	MS	1—220
3. Ctsk	MD	1—220	3. Shear round	MS	1—350
4. Weld	MH	3— 90	4. Bend	MD	1—310
5. Grind	MG	1—375	**HF 75 MIB**		
6. Shear round	MS	1—350	1. Ream	MD	2—350
			HF 75 MIL		
			1. Ream	MD	2—350

HF 75

1. Assemble	MN	2— 14
2. Dip	MB	7—150
3. Bundle	MY	9—100

PRODUCT ANALYSIS—ILLUSTRATION NO. 2

plan of wage payment. The figures are recorded as far as they have been developed on the product analysis sheets opposite the operations (see illustration No. 2), unless elementary coefficients are used for varying operating conditions which cannot be recorded in a single figure.

The development of these operating standards is taking place continuously. In the beginning it was a more or less cursory recording of what took place, uncovering many conditions which were responsible for great variations in output. Where the standards were improved, this was without exception due to a change in the division of work, and not even temporary standardiza-

INSTRUCTION CARD	OPERATIONS	STORES OR WM
	1. Unload	VLS $60 SIA
Date	2. First shear MSS	VLS 390 SIA
Sept. 9th, 1927	3. Second shear MSS	VLS 395 SIA

	Time Allowed
1. UNLOAD—one man	
Once per carload	
1. Place runway from building to car	3.00 Min.
2. Unbolt dunnage on both ends	4.00
3. Pick up first sheet and drop on runway	.50
4. Place two platforms at right angles to shear	3.00
Once per Sheet. Repeat for n sheets in shipment	
1. Pick up sheet, drag from car, pivot and drop at right angle to shear blade	.54
2. FIRST SHEAR. Two shear men and one catcher	
Once per Operation	
1. Set shear gage to 19½". Check it. Oil	4.00 Min.
Once per Sheet. Repeat for n sheets	
1. Pick up sheet	.13
Once per Sheet Trip. Repeat 6 times for n sheets	
1. Move sheet to gage and trip shear	.05
Once per Shift. Repeat n tons divided by 1.5	
1. Replace loaded platform with empty	5.00
3. SECOND SHEAR. One shear man and one catcher	
Once per Operation	
1. Set gage to 10" or 12". Check it. Oil	4.00 Min.
Once per Shift—as above	
1. Move FIRST sheared steel into position	10.00
Once per Second Sheet. Repeat n *first* sheets times 6	
1. Pick up sheet	.07
Once per Shear Trip. Repeat n *second* sheets times 4	
1. Move sheet up to gage and trip shear	.05

General Instruction.—Oil the machine before starting. In setting the gages check front and back gages for perfect alignment, place square and sheet edge on straight edge for checking squareness of blanks. Do not proceed unless gages are right. In picking up sheets and moving them up to the gage take care to be opposite the catcher, bear either to the left or right, so that material will move in a straight path to its pile on the platform.

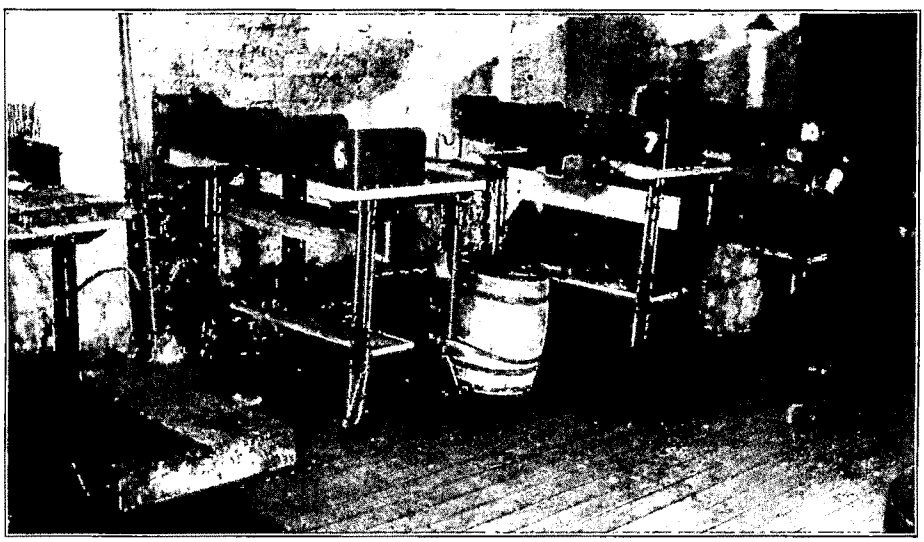
INSTRUCTION CARD—ILLUSTRATION NO. 3

tion of process could be thought of until the operations were studied and a more equitable division of work and responsibility was effected.

In many instances the study of operations led to the construction of better tools and improved set-ups, sometimes the study brought about a new design of the product itself, and sometimes special machines had to be devised to obtain satisfactory solutions for effecting standards of efficiency as well as standards of quality.

The study of operations with the view of establishing standards for them was guided by the fundamental thought of the dynamic, straightway production method. Accordingly, work was *so* divided and rearranged that the greatest possible number of

successive operations were of equal duration and could be coupled together under *one* standard. Thus, in making shovels or scoops, all assembly operations, about 20, have been "balanced," with the result that the product is not batched until ready for shipment. The handling of bulk between operations has here been eliminated, and the stress of control greatly lightened: the "static" element of work has been minimized.



Dimensions: 29" deep x 48" wide x 35" high, built on standard bench legs, with 8" backguard and movable division boards. The top plank is drilled for standard attachments required by bench operations for various products.

STANDARD INDIVIDUAL BENCH—ILLUSTRATION NO. 4

The standardization of an operation is the sum of the standards of each work element inherent in the operation, and the standard of the work element is the result of standardized equipment and environment. Detail instructions for maintaining and controlling the operating standards are based on standard tools, jiggs, auxiliary equipment and environment, of which examples will be briefly enumerated in the following chapter.

C. STANDARDIZATION OF TOOLS

The rules for classifying tools are similar as for materials. We distinguish between machine tools, product tools and general tools and have classified them accordingly.

The machine tool classification is a list of all work places, and is identified by the letter M. MA stands for automatics, MD for drills, MH for hammers, MN for benches, MP for presses, MZ for saws, etc. They are recorded opposite each operation on the product analysis sheet. (See illustration No. 2.)

The product tool classification concerns all tools used on machine tools and work places for one class of product only. Their symbols are made up by the addition of two letters to the product store or work material symbol.

To illustrate:

VHF75SIP T P

In which VHF75SIP shows the WM

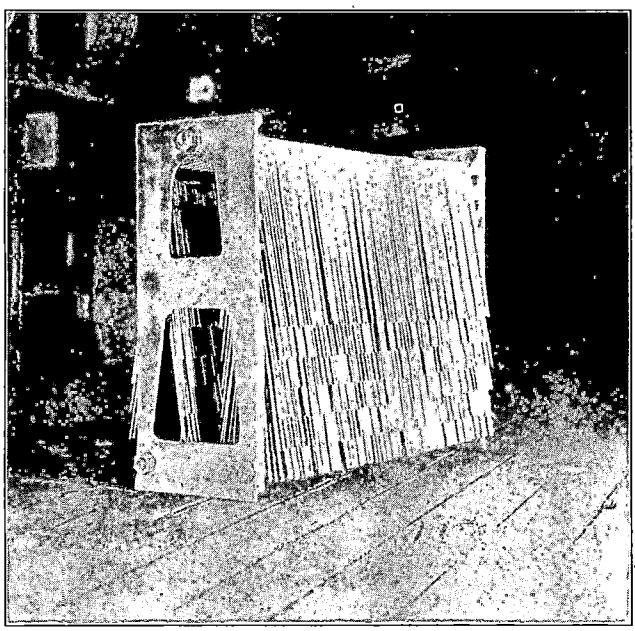
T—that it is a tool

P—that it is punch

The general tool classification concerns tools which have not been specially made for a product, but which have universal application or might be

bought in the open market, such as hammers, pliers, screw drivers or chisels. These tools are identified by the letter T and, of course, are not prefixed by a WM symbol.

Physical and mechanical developments of tools and fixtures in the course of standardization may be better understood in the light of the following concrete examples:



Dimensions, 8″ wide x 25″ long x 18″ high. Capacity, 2000 teeth; displacement, 2 cu. ft. Consists of 12 removable rods resting in cinched notches on end frames. Rake teeth are stored on these racks nested. Old method of handling these teeth loosely in barrels required 9 cu. ft. of space.

STANDARD RAKE TOOTH RACK—ILLUSTRATION NO. 5

1. *Individual benches.* The old type gang bench was a source of interference among the men, could not be equipped with auxiliary contrivances, was not suited to an orderly flow of incoming and outgoing work, and made fixing responsibility for good or bad work impossible.

A standard four-foot workbench (see illustration No. 4) with an eight-inch backguard and movable division boards on standard steel bench legs was therefore developed. The benches can be lowered or raised to suit the height of operator, have individual lights, constitute numbered work places, are definitely assignable and are so arranged that neither operators nor their work can interfere with one another. The division boards keep rivets and small parts in order. Where formerly it proved impossible to measure work and insure a standard work method for various products, these difficulties have been largely overcome, the efficiency has been increased on most bench work operations, and the standard of quality is being maintained.

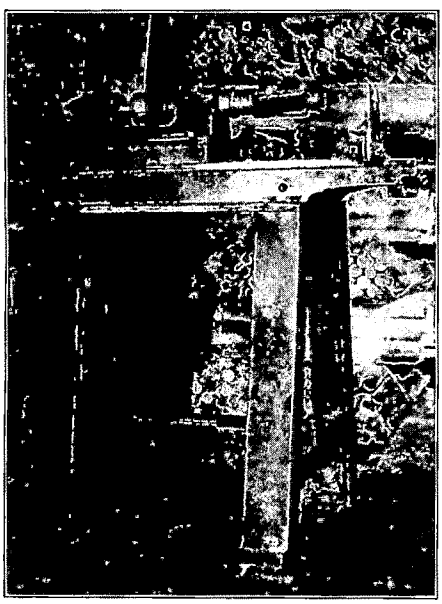
2. *Die shoes.* Where formerly die shoes of various dimensions were used we standardized on one opening and machined the throat to fit the die blocks so as to avoid the use of shims or extended set screws and to eliminate a lengthy process of fitting by trial and error.

3. *Rake tooth rack.* A standard rack to receive rake teeth prior to assembly, and suitable to our standard benches, holds 2000 teeth in a space of two cubic feet as against 1200 teeth in nine cubic feet formerly. The entire 2000 teeth are lifted on the bench and are in evenly convenient reach in positive order, whereas formerly only 250 teeth at a time were lifted out of a barrel onto a bench in a loose heap. The saving of extra moves and false moves can readily be calculated. (See illustration No. 5.)

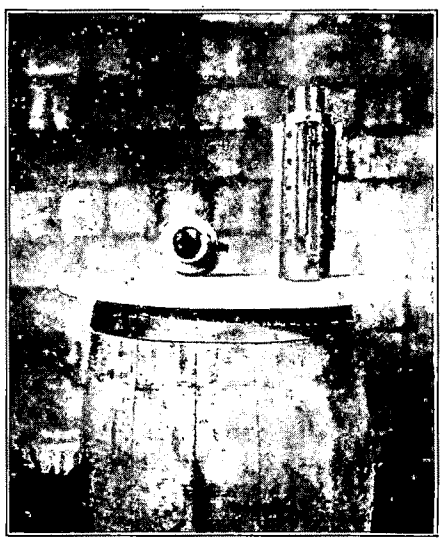
4. *Standard shovel socket.* The socket has been standardized for *all* shovels and scoops made at our plant. While this means a standardized construction of product, it was caused by the problem of tool standardization, pertaining specially to such tools as the handle chuck, blanking dies, closing dies, multiple drill and riveting equipment. Incidentally, the rivets themselves were standardized. This means not only a very considerable saving in equipment and its upkeep, but also a reduction of the expense of changing set-ups which we now often keep intact for weeks, permitting the continuous running of various shovels and scoops. Furthermore, the standardization of the socket for *all* shovels and scoops provided the economic justification for developing and installing an automatic handle chucking machine.

5. *Automatic chucking machine.* Chucking a handle means turning its lower end to the exact taper required by the shovel socket. The old method of hand chucking required two men and offered no equipment except a fast revolving spindle with a single knife cutting tool, into which the handle was pushed according to the judgment of one of the operators or both of them. The average output of these two men was below 200/hr. They suffered burned hands and sometimes more serious accidents when a handle would stick, break and fly about. (See illustration No. 6, Exhibit A.)

We developed a two-knife cutting tool balanced both statically as well as dynamically, *i.e.*, the knives are arranged so as to cut evenly on opposite sides of the handle and the frame is machined out of a solid piece of machine steel in such a way that its center of gravity is in line with its axis. Incidentally, this design was adopted as a standard for all other chucking opera-

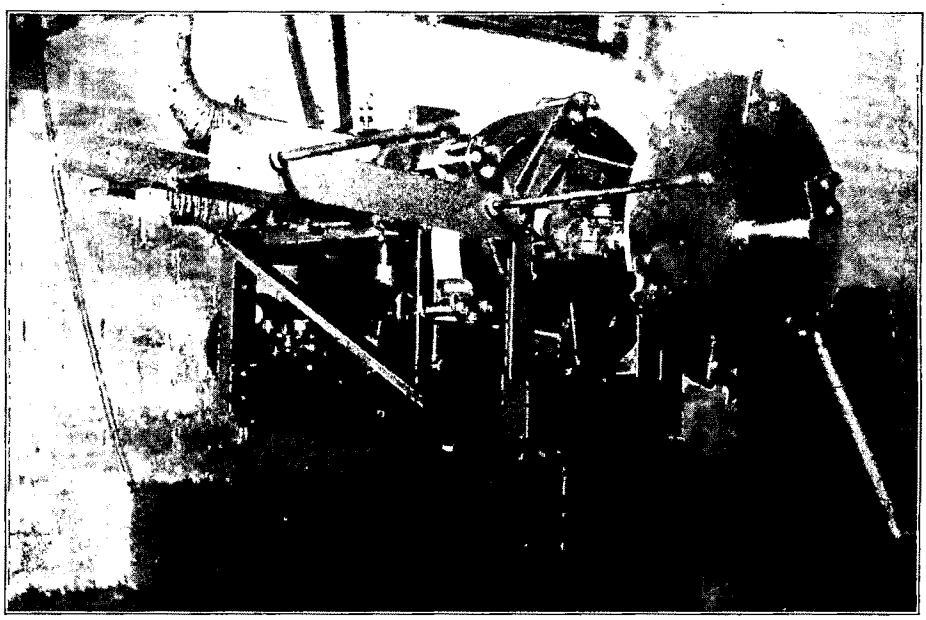


Capacity 200/hr. with 2 men. Method is unsafe and does not produce uniformity of quality.
Old Handle Chuck—Exh A



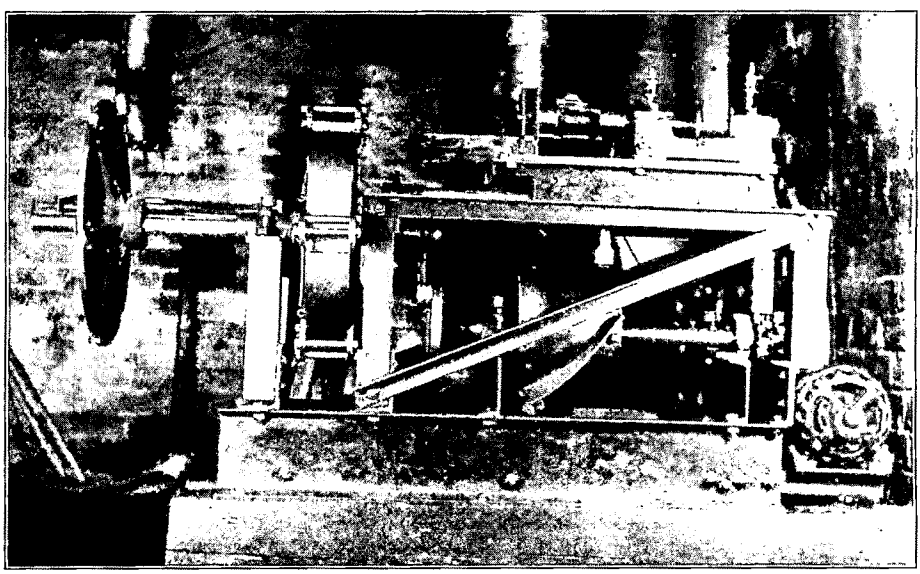
Chucking tool of 2 knives balanced statically and dynamically. Knives are held by 5 set screws and are not weakened by any holes.
Exh. B

AUTOMATIC CHUCKING MACHINE—ILLUSTRATION NO. 6



Capacity 500/hr. with one man, method is safe and provides standard quality of output. This view shows intake side and arrangement of adjustable feeder apron.

Automatic Chucking Machine—Exh. C



Showing discharge side of Exh. C. where the sanding operator takes each handle as delivered and places it into the sanding machine. Straightway working method.

AUTOMATIC CHUCKING MACHINE—ILLUSTRATION NO. 6

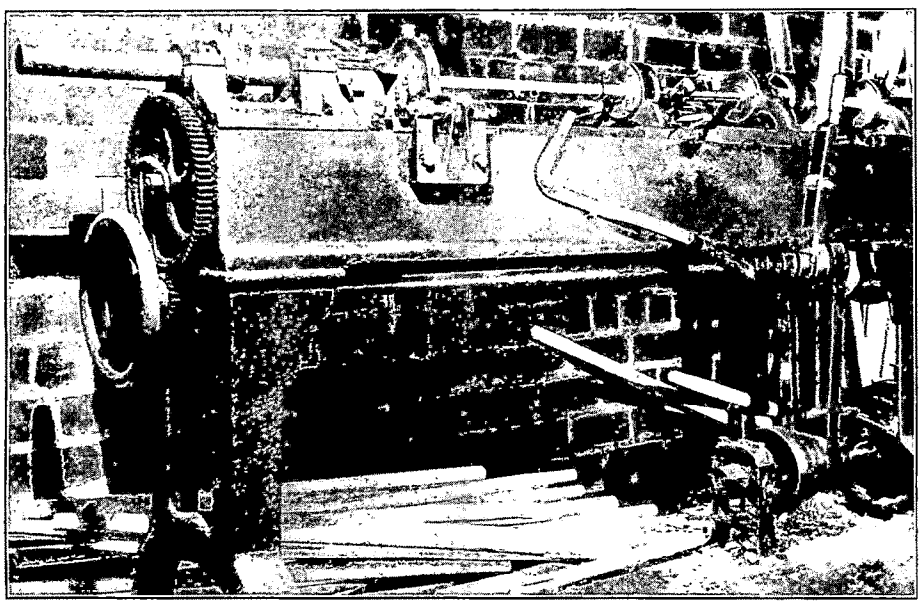
tions as it reduced vibrations, minimized interruptions and, of course, developed double the cutting capacity for the same number of revolutions. (See illustration No. 6, Exhibit B.)

This cutting tool was mounted into the automatic chucking machine. This machine is built on the dynamic, straightway principle, picks up a handle at a time in its open dial jaws, closes these jaws tightly as it moves up into position by a ratchet movement and discharges the finished handle after the cutting tool on its carriage has done its work. The standard operating time is 500/hr. for one man as against 200/hr. for two men formerly. (See illustration No. 6, Exhibit C.)

Not only did we gain an actual automatically counted, operating standard, but by the alignment of the machine we obtained a standard taper of nearly absolute symmetry and minimized the hazard of personal injury.

As the chucking operation is followed by sanding, the standard of 500 four-foot handles per hour has been made to apply to the sander also, by increasing its speed proportionately, and the handles are passed through the sander as fast as the chucking machine delivers them.

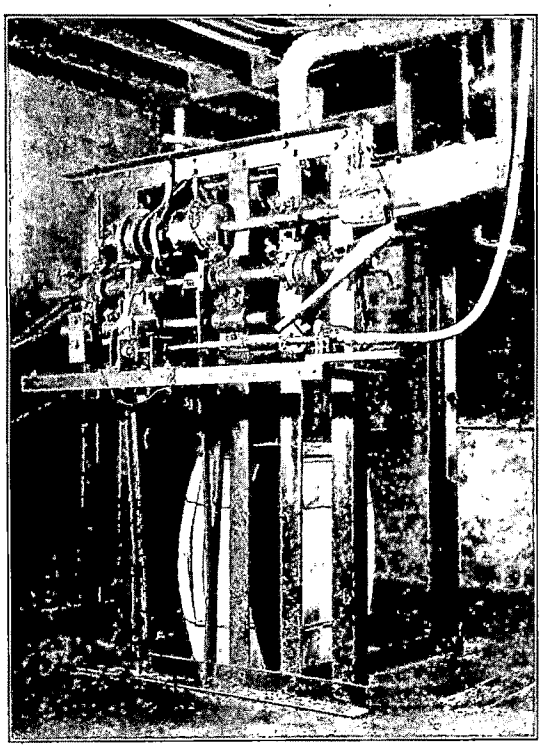
6. *Rake tooth machine.* The development of this machine involved a complete revision of the process of making wooden rake teeth and a change of the final unit. The old machine used a square stick 5/8" x 5/8" x 17¼" out of which three teeth were formed by way of a reciprocating ratchet feed, leaving a dead end 3⅜" in length. The operator had to insert each stick and catch each finished tooth by hand. A new stick could not be inserted into the machine until the preceding three teeth, one after an-



OLD WAY.—Unit, 5/8" x 5/8" x 17¼". Direct Waste, 3⅜" or 20%. Capacity, 300/hr. Reciprocating ratchet feed, hand served. Constant 3 point center of attention by operator. Fatigue factor about 45%. Hazard of injury to left hand.

AUTOMATIC RAKE TOOTH MACHINE—ILLUSTRATION NO. 7A

other, had been taken out and the remnant end removed. This involved not only a great fatigue element, owing to the posture, distance of movement and three-point center of attention of the operator, but also a 20 per cent waste of all material prepared for the machine.



NEW WAY.—Unit, ½" round x 4½". No direct waste. Capacity, 900/hr. Automatic feed from hopper through pneumatic tube. No fatigue factor, less floor space, lower power consumption, assured safety. Dynamic straightway production process.

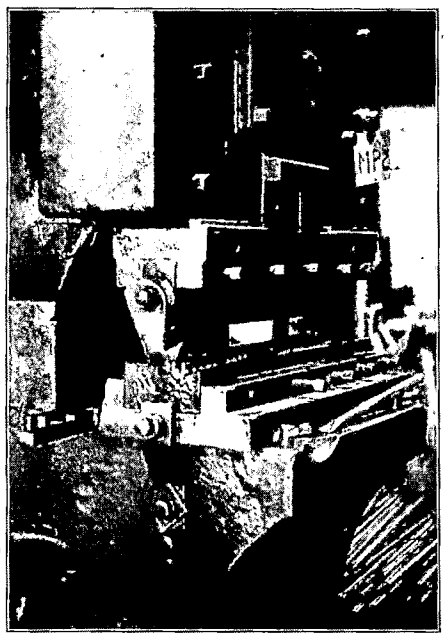
AUTOMATIC RAKE TOOTH MACHINE—ILLUSTRATION NO. 7B

The new machine process cuts ½" round by 4½" long dowels beforehand, which are the standard units, and feeds them automatically into a dial by means of a pneumatic tube. This dial simultaneously moves the dowel into a position where two cutting heads will close in upon it, discharges the preceding finished rake tooth, and picks up the next one. The operator is merely charging the feeding hopper and is otherwise free to watch the performance of the machine, gauge the dimensions of the product, and take care of lubrication. The capacity of this machine is 900/hr. as against an average of 300/hr. formerly; there is a 20 per cent direct saving of material, and an indirect saving owing to the smaller unit of 4½" as compared with 17¼" length. (See illustration No. 7.) The principle here, too, is the dynamic continuous method and the standard is measured by an automatic counter in a positive manner.

7. *Rake head rolling mill.* Our wire lawn rake heads are formed into a tube of a somewhat square shape after the flat blanks have been gang punched. This forming operation used to be done on a press over a mandrel which was placed into the U bend.

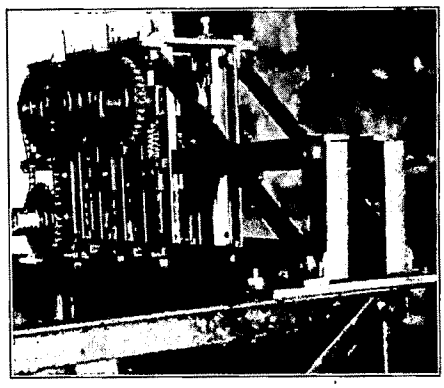
Studies revealed great variations in output owing to the mandrel sticking, and the process of inserting and taking out of the forming dies proved slow and tedious. (See illustration No. 8A.)

To overcome these troubles a small three roll mill was constructed which rolled the head in a straightway even speed. (See illustration No. 8B.) As the forming is taking care of itself, once the steel is started into the mill the operator is free to pick up the next steel and have it ready for insertion before the preceding steel is entirely completed. Thus, not only a standard performance was achieved, but also a considerable increase in efficiency. The standard of the mill is 900/hr. as against 150/hr. with the old mandrel process. Incidentally, the cross sec-



Old method of forming steel rake heads on press operation over mandrel. Capacity, 150/hr.

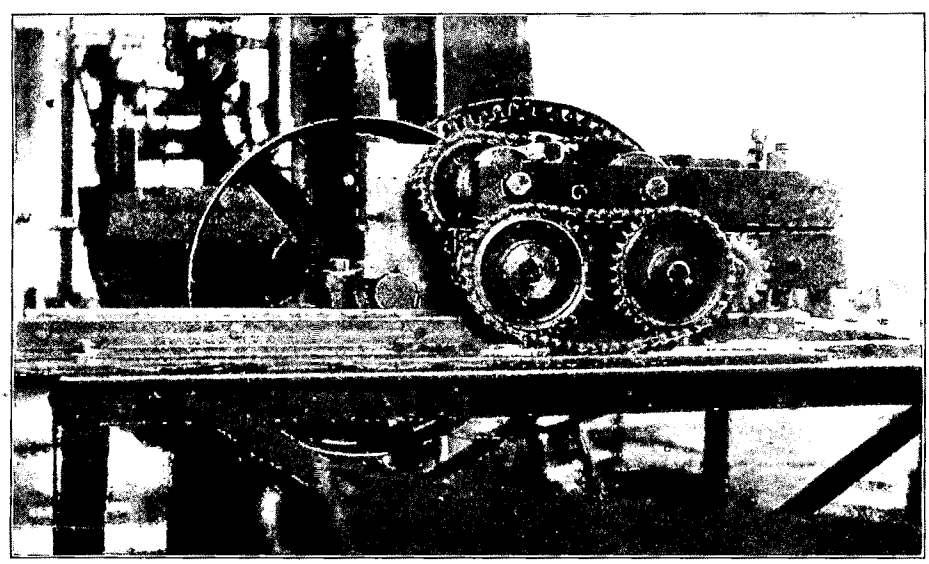
Exh. 8A



Original design of rolling mill, improved as shown in Exh. B. Principle of straightway, continuous production method.

tion of all steel rake heads has been standardized to fit the mill, the length being immaterial to a single pass rolling operation.

8. *Automatic handle painter.* Considerable trouble was experienced in obtaining a standard finish on our rake or shovel handles. The old method was provided to replace the sanding

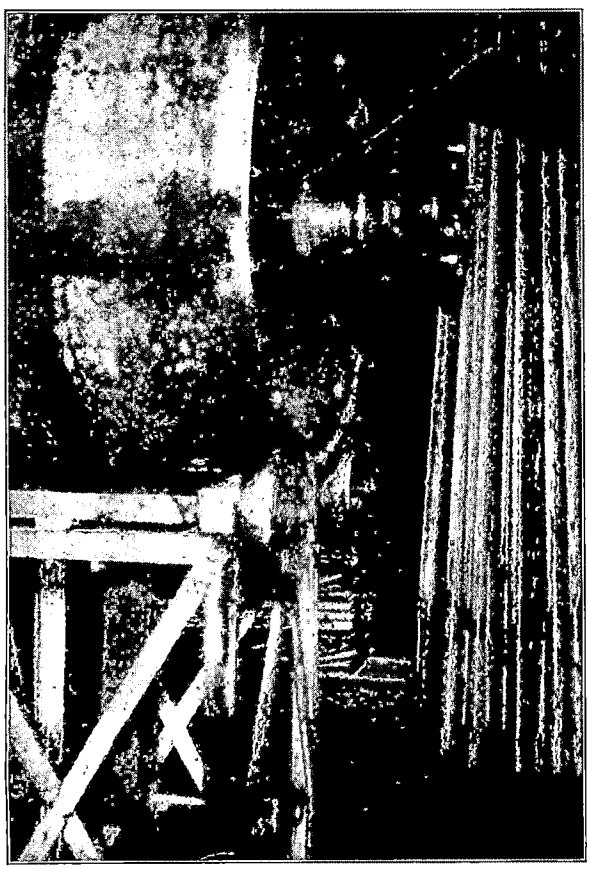


New method, multiple roll, single pass rolling mill. Capacity 900/hr.
Exh. 8B

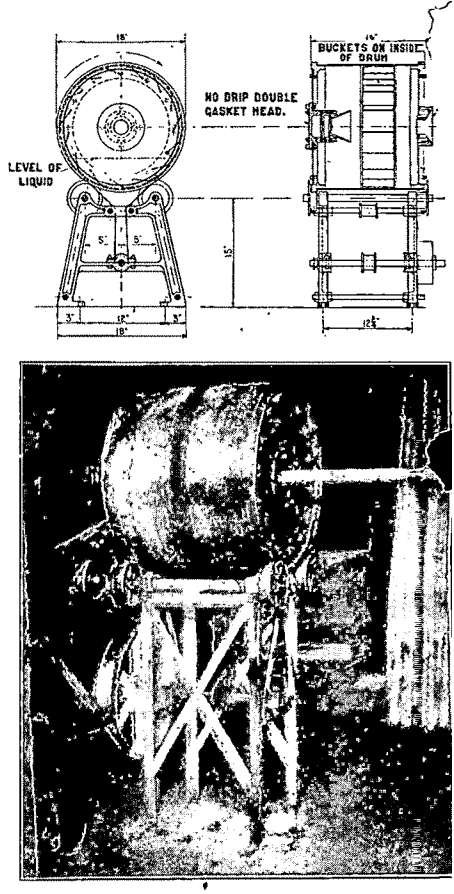
RAKE HEAD ROLLING MILL—ILLUSTRATION NO. 8

belts of the sanding machine with canvas, apply a coat of wax to the canvas and pass all handles through the machine a second time for this waxing operation. A uniform application could not be achieved with this equipment as the wax rapidly decreased on the fast spinning canvas belts, resulting in a rapidly diminishing finish until the wax was again replenished on the belts.

The automatic handle painting machine evolved to meet this contingency consists of a drum revolving on trunions and is equipped with buckets on the inside. The handles pass directly from the sander through center openings of the drum, about one-fourth filled with lacquer or clear duco. As the drum revolves, the buckets are turned upside down in the course of each revolution and empty their contents on the handles. The outport of the drum is equipped with a head holding two gaskets of pure, elastic rubber, with holes somewhat smaller than the diameter of the handles, so that they produce a reliable stripping action as the handles are pushed through. The principle is known as the "gasket dip method." Our contrivance elaborates it to a continuous, straightway



Gasket head pulled out of the drum showing arrangement of the gaskets and drip ports.



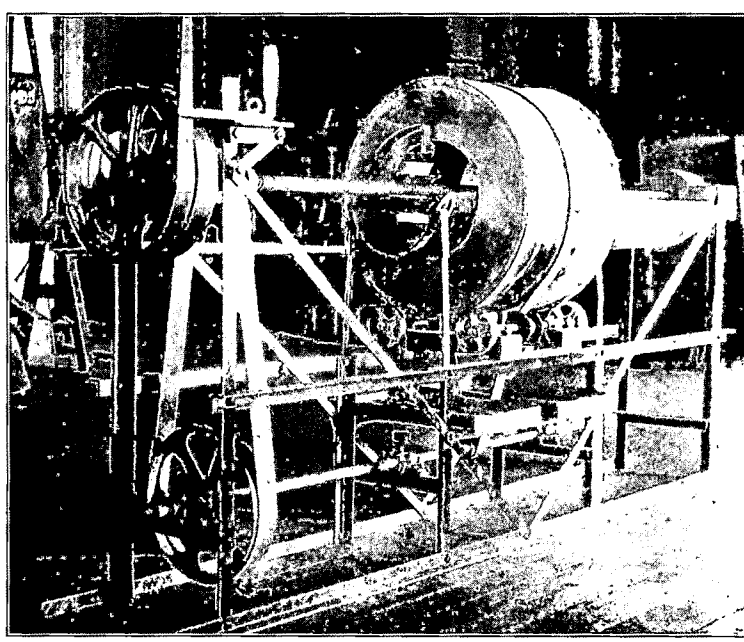
Provides continuous, straightway production method and a standard finish. *Patented.*

AUTOMATIC HANDLE PAINTER—ILLUSTRATION NO. 9

method and makes it automatical by coupling it directly to the sanding machine, which henceforth performs both sanding and painting in one operation. As the sander has an automatic invariable feed, the painting operation thus also becomes standardized. (See illustration No. 9.)

9. *The aluminum bronzing machine.* The old method of mixing up a thirty-gallon batch of aluminum bronze and varnish in a tank and painting the products by submerging them therein, proved highly unsatisfactory. This, because the amount of material so mixed was greatly in excess of what was actually needed to cover the product, and also because the settlement of the bronze flakes to the bottom of the tank soon caused the consistency of the mix to lose its uniformity with a corresponding change of the lustre of the finish. Mechanical stirring devices and air blown into the mix were only partially successful, and did not produce the desired result.

The solution was found in our automatic aluminum bronzing machine, consisting of a drum, revolving on trunnions and equipped with buckets on the inner wall of its mantle. The openings in each end are commensurate with the size of the articles to be painted, and a screw is leading through its vertical center. On this screw on suitable hooks the articles pass through the drum as it revolves, slow enough for a complete drenching and fast enough for a high labor efficiency. Between one to three gallons are continuously being dipped up and dropped again as the buckets turn upside down

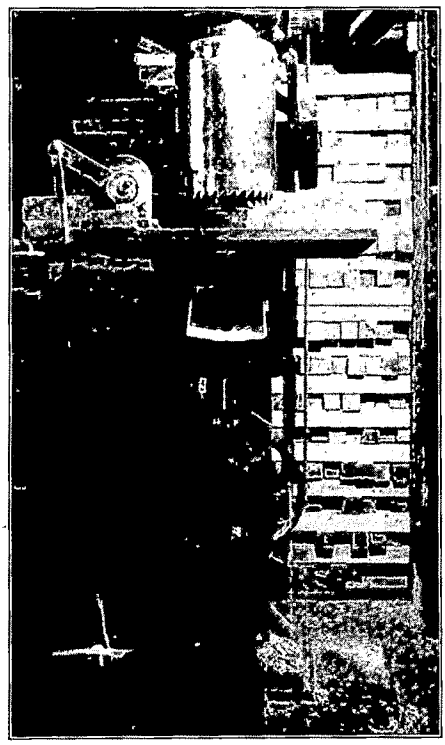


Amount of liquid revolving with drum is from one gallon minimum to 3 gallons maximum. Baffles or buckets on the inner wall of the mantle produce a continuous mixing action and at the same time a complete drenching of any articles passing through the drum. Provides straightway, continuous production method and a standard, otherwise unequalled, lustre of finish. *Patented.*

ALUMINUM BRONZING MACHINE—ILLUSTRATION NO. 10

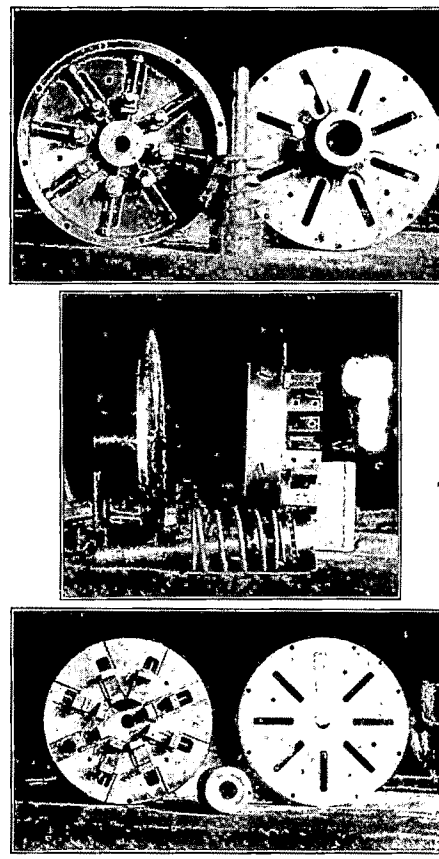
in the course of each revolution. The articles are carried through the drum on a screw as we have described, and out over a dripping pan so arranged that any drippage runs back into the drum and is again absorbed and thoroughly mixed by the main body of the bronzing fluid. (See our illustration No. 10.)

The economic significance may be readily understood when comparing one gallon in the drum with thirty gallons in the old submersion tank. Actual performance showed a consumption of only fourteen pounds of bronze as against seventy pounds for a batch of 350 dozen wire lawn rakes; but more important, a standard of efficiency and a standard of quality were achieved, and thus, our primary object realized.



Old type round saw for one diameter only. In case a tooth broke all teeth had to be ground and filed to new level.

Exh. A



Standardizing *one* tooth interchangeable for 8 radial carriages and adjustable for any diameter from 4″ to 14″. Mounted into old Press shown in Exh. A.

Exh. B

UNIVERSAL ROUND CUTTER—ILLUSTRATION No. 11

CONCLUSION

In conclusion we wish to point out that while we have distinguished between standardization of material,

operations, and tools, and while the standards have been evolved in this general sequence, all three departments have their retroactive influence upon another, often necessitating a retracing of ground and not permitting the adherence to a strict program.

The efforts to establish standards have made us realize our limitations and imperfections, but unfailingly pointed the way to achievement and progress.

Gages as an Instrument of Control in Mass Production

By JOHN GAILLARD
Mechanical Engineer, American Engineering Standards Committee

THE necessity to defend his existence against the influences of his surroundings forced primitive man to become a provider of goods before he had grown up to master the arts of manufacture and measurement.

The first goods he used were supplied him in ready-made form by nature. Boulders and wood clubs constituted the first means of preparedness in addition to the strength of his own limbs. Man in that early stage could collect things, but he could not shape them. Tools were unknown to him.

Then, one day, he got the idea of striking chips off a piece of flint to give it a new shape, thus making it more suitable to serve as a chisel, one of his first tools. By this shape-giving process consisting in the removal of material from nature's coarse product, he entered the first stage of manufacture whose principle is analogous to "subtraction" in arithmetic. This principle remains today one of the most important in the manufacturing industries; the wood working industries, for example, still apply it to products as directly supplied by nature, while the metal working industries apply it to products having undergone first a certain transformation in the hands of man, for example, by casting, forging, or rolling.

The possibility and necessity of a further step in manufacture became evident. A pointed tool, similar to the chisel, and tied to a wooden shaft, provided a suitable arrow or spear. This manufacture required the combination, or "assembly," of several parts, in addition to the processes by which they were given a proper shape. Thus man started a higher form of manufacture corresponding to "addition" in arithmetic. Its application required, if not yet actual measurement, at least a much better judgment of the proportions of, and the correlation between the component parts of built-up products, than the manufacture of elementary parts on the "subtraction" basis ever had done. A string of suitable strength and length had to be selected to tie arrow point and shaft together, else the parts might separate even before the arrow was used.

HANDICRAFT

We do not know in what stage of the development of man's manufacturing skill the ever keener judgment of his growing craftsmanship began to be supported by measurement as we understand it today, that is, the determination and expression of dimensions (in the widest sense of the word) in definite units. It is certain, however, that so far as the elements of a composite product were concerned, direct comparison of their essential dimensions, especially those governing proper assembly, became a question of increasing importance. The parts had to "fit" correctly together, if they were to blend into a whole answering its purpose well.

Home manufacture of the necessities of life spread out and differentiated into trades. The expert craftsman, concentrating on the problems in his own line, devised new tools and equipment specially adapted to his

work and began to lay down his experience in terms of measurement, for the purpose of planning and record. The guilds born from the glory of handicraft crystallized standards of workmanship, and the pride of their masters was to be able to create the entire product, with great perfection in all its details.

Both shape-giving and assembly of the component parts were problems of the individual craftsman. The cabinetmaker was expected to be able to produce a perfect dove-tail joint as well as to turn or carve a leg, or plane a panel, of a piece of furniture. The locksmith had to make a hinge which not only was a beautiful forging, but which also was loose enough in its joint to swing smoothly, and tight enough to keep the door or lid in the right path. The craftsman could ponder over his work and give it all the care required to comply with the high standard set for the masterpiece before it was finally delivered to the user, an eloquent achievement of the craftsman's all-round skill.

MECHANICAL PRODUCTION

The introduction of steam as a driving power put at the disposal of the manufacturing trades production machinery whose operating members were driven at a higher speed and with greater force than the human hand had been able to impart to the tools of the handicraft period. The capacity of production per unit of time was thus increased manifold while new technical possibilities were opened. Moreover, the tirelessness of the machine extended the possible actual working time far beyond the point where human beings would have been forced to quit, their energy giving out.

On the strength of these two advancements, the production of goods soared quickly, raising with it the level of average living conditions, a fact which in its turn again stimulated the demand for greater and better production. This phenomenon of mutual induction increased the demand for higher speed of production to such a degree that new methods had to be introduced in order to satisfy the demand. The speed of the shape-giving operations (which now had largely become "machining" operations) having their technical limitations (running a lathe too fast will spoil both the tool and the workpiece), an attack was made on the methods of assembly. Most products being of a composite nature and therefore requiring assembly operations, much was to be gained if an advance could be made in this direction.

ASSEMBLING OPERATIONS

Assembly methods had not participated in the progress made by shape-giving operations. The workman was still assembling "mating" parts by starting out with too large a total amount of material and removing the excess by the method of "subtraction"; an internal and an external part were made to fit together either by reducing the size of the internal part or by increasing the size of the hole in the external part. Therefore, while in the shape-giving operations the workman had received considerable help from the machine-tool to which part of his effort and skill had been transferred, his status with regard to the assembling operations had not materially changed since he was a craftsman. This fact was due to several conditions. First, the fitting together of parts in the manner then used, required a considerable amount of effort in observation, comparison, and correction of the dimensions of the parts concerned, before the right fit was obtained. The motions involved in assembly opera-

tions being more numerous and more complicated than the elementary operations such as turning, planing, drilling, and the like, which had been entrusted to the care of the machine-tool, mechanical equipment for the performance of assembly operations would have been too intricate and consequently too costly an investment. Furthermore, the young machine was, in some respects of accuracy, still at a disadvantage in comparison with the direct descendant of the old time craftsman: it could not yet work with the high precision acquired by the human race through centuries of experience and training. Man had, it is true, put the machine in charge of many operations, but he had still much to teach it.

MASS PRODUCTION

The solution was found in so-called "mass production," characterized by a greater subdivision of the production process than had obtained heretofore, and a distinct separation between shape-giving and assembling operations.

In the form as originally developed, mass production consisted in the manufacture of the component parts in separate lots and in quick succession, followed by their assembly into the final product. Such procedure still involved a certain stagnation in the progress of the components, caused by the fact that all but one of the parts of a lot accumulating in a particular production place, had to wait till the completion of the lot before being shifted to the next operation. A lot might even be temporarily stored before entering the production process again.

The waiting periods inherent in "lot production" are avoided in a more modern development of mass production, namely, "continuous flow production." The principle of this method consists in that the component materials or parts either move at once, after the completion of an operation, to the next operation place, or move continuously (on some kind of conveyor) past the various subsequent operation places. This cuts down the total production time considerably and consequently makes both for higher capacity of production (output per time unit) and for a larger return on capital invested in raw materials, because of quicker turnover.

Both lot production and continuous flow production are applied in mass production of the present, the answer to the question which of the two is the most economic, depending on the particular conditions of each individual case, such as the kind of industry, volume of production, availability of skilled labor, and other factors.

The divorce, in mass production, between shape-giving and assembling operations, resulted in greater possible concentration in both fields and a corresponding increase in efficiency. The elimination of the waste of time involved in changing over, in the old system, from machining to assembling operations and conversely, brought about part of the savings.

It thus happened that, just as long ago the demand for more and better products had chased manufacture out of the home and dispersed it, subdivided and specialized, over many trades, the same phenomenon now caused the manufacture of composite products to split up into the separate manufactures of their component parts. Here also was an opportunity for greater specialization and stronger concentration as to quantity and quality of output, than in a production process where one individual or group was the creator of the whole, although with the help of machinery.

INTERCHANGEABILITY OF PARTS

For the proper execution of the plan of separate shape-giving and assembly operations, the fulfillment of one condition became imperative, namely the interchangeability of parts of the same kind, so that any part taken at random from the lot in which it was produced, would equally well answer the requirements of a correct fit when assembled. Indeed, if in assembling the parts they had to be selected as to size, much of the gain in time and effort obtained by the new plan would be lost again, or even the new procedure might unfavorably compare in this respect with the old one involving combined shape-giving and assembly operations.

Interchangeable parts may be obtained by keeping their dimensions closely to the carefully selected dimensions laid down in the basic design of the product. This design represents ideal conditions which, however, cannot materialize in actual production. Although basic or nominal dimensions are specified, certain deviations from these, caused by imperfections in the manufacturing process, cannot be avoided. For example, the production machinery, accurate though it may be, is subject to constant wear. The tools (lathe tool, grinding wheel, milling cutter) in removing material from the parts being machined, are to a lesser degree, but constantly, decreasing in size themselves by loss of material at their cutting edges or surfaces. While the machine is adjusted, at the start of a machining operation, to produce parts of a definite size, this wear of the tool causes the size of the parts subsequently produced, to change accordingly. The diameter of shafts or pins, turned on a lathe, for example, increases as the cutting edge of the lathe tool wears down. The wear of a reamer used for finishing drilled holes in order to give them the correct size and high grade surface, causes each hole to be slightly smaller than the previous one. The difference in size between two consecutive parts is minute, the steel of the tool being highly resistive, but the effect accumulates steadily; the parts "grow" in size—on the outside or the inside, as the case may be—as the tool wears.

Fortunately, a slight deviation from the basic dimension of a part can be allowed to occur without its impairing the correct functioning of the part. How large the permissible deviation is, depends on the nature of the part and on its particular function. The permissible total variation in the size of a part is called the "tolerance" on its size. Two extreme sizes, a large one and a small one, form the boundaries of the tolerance; these are the "manufacturing limits" or briefly, "limits." Economy of production calls for the adoption, by the designer, of the largest possible tolerances compatible with good technical results, or in other words, of the widest possible limits.

The basic principle then, underlying the manufacture of interchangeable parts, is that any part whose actual size is "within the limits" is acceptable with a view to assembly conditions. The exact value of its size is of no particular importance; the fact that the deviation from ideal size is smaller than the tolerance guarantees that it will answer its purpose in a satisfactory manner.

The variation in actual size of the parts, caused by the wear of tools and other imperfections in the manufacturing process, does not constitute, therefore, a real difficulty. For example, the constant "growth" of a part through tool wear can be safely allowed to go on, provided that it be stopped, by resetting the tool to its original position, before the size tres-

passes one of the limits set for such part.

Maintenance of the size of the parts between their limits is imperative, if wasteful and costly errors are to be avoided in the assembling operations. As, moreover, occasionally certain parts of a mechanism must be kept within the limits as close together as a few tenthousandths of an inch, a continuous check must be made as to whether or not they are "true to size." The term "continuous" does not mean in this respect that such check must always be made on every individual part; the accuracy of the machine-tool, in combination with a fairly large tolerance on the parts, often renders it possible to perform a satisfactory inspection by picking, from time to time, one part from the lot in which it was produced and finding out whether its size is acceptable. If so, it may be safely assumed that all parts, produced since the previous check was made, are also acceptable. However, in cases where the parts have to fulfill an essential function in the assembled product and its tolerance is small and therefore liable to be soon exceeded, a check on every part produced may be necessary.

HIGH SPEED INSPECTION

Mechanical mass production thus gave rise to the problem of checking the size of the large number of parts delivered with great accuracy by high capacity production machines; in other words, of checking at high speed and with extreme precision. Previous to mass production, in the days when both machining and assembly were in the hands of one operator, the latter used to measure the parts to be assembled and to conclude from this measurement whether or not their size was correct. Sometimes, he would even try out in what manner both parts would fit together, making thereafter the necessary corrections on their size.

The older method of checking the size of a part by measuring it, was obviously unfit to match in mass production the speed of inspection to that of machine output, unless several inspectors took care of the parts delivered by a single machine, a solution which would be incompatible with the principle underlying the use of production machinery, of saving human labor and time. In fact, this method consists of three elementary operations: first, adjusting the measuring device to the actual size of the part; second, reading the indication of the measuring device; third, determining whether or not the size is acceptable. (This would mean, in the case of interchangeable manufacture, whether the size indicated is within the limits.)

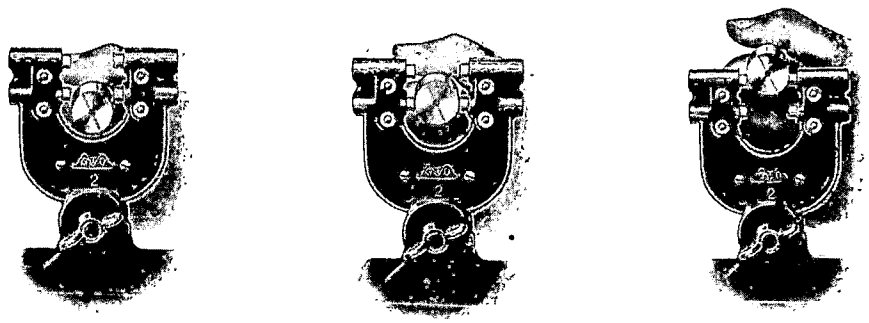
The first operation is a purely physical one requiring a certain number of motions. For example, a micrometer must be adapted, by screw displacement, to the diameter of a shaft or similar part. The second and third operations are mental ones, distinctly requiring, in addition to time, a certain care, as an error made in any of them will nullify the value of the checking operation.

The fact that the actual size of a part is of no primary importance with regard to its acceptability, the criterion being solely whether or not its size is within the limits, made it possible greatly to simplify the checking operation. If, indeed, the limits of a part were physically laid down in some kind of device by means of which the size of the part could be compared with each limit in a direct manner, that is through actual contact, the determination of the actual size of the part could be foregone.

LIMIT GAGES

This idea was embodied in "limit gages," measuring devices representing

the manufacturing limits of a particular part, or serving for several parts having the same limits. To take a concrete example: a common form of limit gage for the outside dimensions of a part, say the diameter of a shaft or pin consists of two cylindrical plugs whose diameters represent the high and the low limit of the hole respectively. The "go" plug can enter an acceptable hole, while the "not go" plug is refused.



Too small
(Part has passed both sets of points)

Acceptable
(Part has passed upper points, but hangs on lower)

Too large
(Part will not pass upper points)

INSPECTING A PART WITH A LIMIT SNAP GAGE *

or the thickness of a sheet of metal, is a so-called "snap gage" consisting of two pairs of jaws, each provided with two measuring surfaces. Two of these measuring surfaces are set apart a distance equal to the high limit of the part, the distance of the other pair equaling the low limit. Any pin passing between the measuring surfaces of the "high limit" jaws and not able to pass between those of the "low limit" jaws, obviously has an actual size lying between the limits and therefore is acceptable. The "high limit" set of surfaces of a snap gage are called the "go" side, the "low limit" set the "not go" side of the gage a workshop terminology chosen in accordance with the manner in which acceptable parts behave with regard to each side of the gage. A form of limit gage extensively used for checking inside dimensions, as for example the diameter of a hole, The "go" and "not go" sides of a limit gage together sift out the acceptable parts, in the same way as a pair of superposed horizontal sieves with a difference in width of mesh would single out, in the space between their levels, those particles of a granular material whose size lies between the two widths of mesh.

The manipulation of limit gages is very simple. A snap gage, for example, is let down on the shaft or pin to be inspected, and, if the part has an acceptable size, the "go" side of the gage will pass over the shaft, while the gage will remain suspended on the jaws of the "not go" side. If the part is a small one, the manipulation may be reversed inasmuch as the part is introduced between the jaws of the snap gage. In both cases, the operation involves but a few motions requiring no skill and only a small fraction of the

* Illustrations by courtesy of Greenfield Tap and Die Corporation.

time which a measurement of the actual size of the part would take.

The use of limit gages eliminates all of the three elementary operations involved in measurement of the size of the part referred to above. In fact, limit gages require no adjustment to the size of the part, nor the reading of any scale, nor the mental comparison of a scale reading with a specified size. Their check being immediate, automatic, on the basis of feeling instead of sight (and therefore less fatiguing) and requiring a minimum of time, physical and mental effort, and skill, limit gages represent from the point of view of inspection the counterpart of the machine-tools as producers of the parts. Both were developed to attain speed of operation, to save effort and to transfer skill. Mass production having the present degree of efficiency, inconceivable without the use of high capacity production machinery, would be equally unattainable, had not the introduction of limit gaging balanced the shape-giving and assembling processes as to the speed and labor saving factors.

Gages have been dealt with here solely from the viewpoint of mass production in the metal working industries, with which they are directly and intimately connected. Their significance is greater, however, for the reason that all manufacturing industries are dependent, to some extent, on the products of the metal working industries, in form of means for development and transmission of power, production and transportation equipment, measuring devices and instruments. All of these are wholly or partly built up by mass production processes in which gages play their part.

Methods of limit gaging, explained in this article with the aid of a specific example, may also be carried out by means of various other devices, which although different in form, are based on the same principle.

The Development of Safety Standards for Domestic Gas Appliances, by the American Gas Association

By R. M. Conner
Director, Testing Laboratory, American Gas Association

WHEREVER heat is required, the use of gas has constantly been increasing throughout the past century. Today, there are few industries that do not require heat as an absolute necessity. It is used in the home for warmth, for the preparation of food, and in affording many of the other essential conveniences of our present-day methods of living. Many health authorities are now advocating wider use of gas heat to avoid the smoke evil and other inconveniences connected with the utilization of most kinds of solid fuel.

Gas companies for many years have maintained appliance testing and research laboratories of their own. Their activities, however, have had for their object the solution only of their local problems. Until recent years no particular thought or effort was given to the subject of national control.

As early as 1915, plans were under way for the preparation of national standards governing the performance and construction of gas appliances and the establishment of some national testing agency to enforce them. Definite action at that time, however, was postponed by the beginning of the World War, and it was not until the year 1924 that this subject was again taken up for serious consideration.

Preparation of Requirements

The fundamental principles governing the utilization of gas were first set forth in the Gas Safety Code, a manual prepared jointly by a committee representing the U. S. Bureau of Standards and the American Gas Association. Work of preparing the Code began in 1915, and was pursued intermittently until 1920, when it was turned over to the American Engineering Standards Committee for completion. In December, 1925, it was approved as a tentative American Engineering Standard and in 1927 became an American Standard. All of the various appliance or installation requirements are prepared to conform to the rules of the Gas Safety Code.

It was entirely in accord with the spirit of the American Gas Association, as expressed in its constitution:

> To promote and develop the Gas Industry and to coördinate its activities to the end that it may serve, to the fullest possible extent, the best interests of the public.

That the Association in 1924 took over actively the task of preparing and enforcing safety and construction requirements to apply eventually to all types of domestic gas burning appliances. In this program it was assisted greatly by the U. S. Bureau of Standards through its Gas Section, which had been actively interested in the utilization of gas for many years.

The problems confronting the American Gas Association were twofold: First, to determine and set up stringent safety, and reasonable construction standards to be applied nationally, and, second, to provide some agency for enforcing them.

An approval requirements committee composed of representatives of the U. S. Bureau of Standards, U. S. Bureau of Mines, U. S. Public Health Service, and the Master Plumbers' Association, as well as an equal number

of gas company and appliance manufacturer members, was appointed to perform the first duty. To apply the standards, or requirements as they are now called, prepared by the various committees, the Association established a Testing Laboratory in Cleveland, Ohio. The activities of this institution were placed under the supervision of a Laboratory Managing Committee.

Requirements are prepared by the Approval Requirements Committee, which receives major assignments from the Association and delegates this work, with the exception of the preparation of requirements concerning completeness of combustion, to sub-committees. The requirements dealing with completeness of combustion are prepared by a Safety Committee composed of representatives of the U. S. Bureau of Standards, U. S. Public Health Service, U. S. Bureau of Mines, and the American Gas Association. The research necessary in the preparation of safety requirements is conducted jointly by the A. G. A. Testing Laboratory and the U. S. Bureau of Standards at Washington, D. C.

REQUIREMENTS FOR COMPLETENESS OF COMBUSTION

Among the first problems confronting the Appliance Committee was the consideration of a requirement for completeness of combustion, *i.e.*, determination of the carbon monoxide concentration human beings can breathe over a given length of time without any harmful effects. The following table, compiled from the findings of Dr. Yandell Henderson,[1] show the experimental effect of various concentrations of this gas:

TABLE I—EFFECT OF CARBON MONOXIDE FOR A GIVEN TIME ON HUMAN BEINGS

Concentration of CO in Per Cent	Effect of CO in a Given Time		
	One Hour	Two Hours	Three Hours
.01	None	None	None
.02	None	None	Slightly perceptible
.03	None	Just perceptible	Headache and nausea
.04	None	Headache	Headache and nausea
.05	Slightly perceptible	Headache and nausea	Dangerous to life
.06	Just perceptible	Headache and nausea	Dangerous to life

The above table was confirmed by Messrs. Sayers, Meriwether, and Yant[2] of the U. S. Bureau of Mines, who also compiled the following table:

[1] Journal of Industrial Hygiene, III, Nos. 3 and 4, 79–32 and 137–146.

[2] Public Health Reports, 37, No. 19, May 12, 1922, p. 1127, Reprint No. 748.

TABLE II—AFTER EFFECTS OF CARBON MONOXIDE FOR A GIVEN TIME ON HUMAN BEINGS AT REST AND EXERCISING STRENUOUSLY

Concentrations of CO in Per Cent	Subject at Rest				Subject Exercising Strenuously One Hour
	One Hour	Two Hours	Four Hours	Six Hours	
.02	None	None	None	None	
.025	.....	.....	.....	.....	Very mild to moderate
.03	.....	.....	Mild	Moderate	
.033	.....	.....	.....	.....	Mild to moderate
.04	Moderate	.....	.....	.....	Moderate

Apparently these authorities agree that a person exercising or resting when breathing an atmosphere in which there are present three parts of carbon monoxide in 10,000 suffers no effects.

CONDITIONS OF TEST

Since all requirements were to be national in scope, the next problem with which the Approval Requirements Committee was faced was the establishment of tests that would subject gas appliances to the various conditions of gas service existing throughout the United States, for it was obvious that any appliance operating perfectly on one kind of gas and under one pressure might be a real offender under other conditions. For this reason it was apparent that a high degree of flexibility must be insured.

On investigation it was found that usual gases delivered to domestic consumers throughout the United States vary in heating value from about 400 to 1200 Btu. per cubic foot, in specific gravity from 0.35 to 0.70, and are supplied at varying pressures. While it was obviously out of the question to test each appliance under every possible service condition, it was found that the most severe conditions ordinarily encountered in service might be determined and their effect on gas appliance operation anticipated. A careful survey indicated that, by testing with a 1100-Btu., 0.7-specific gravity natural gas at 7 inches water pressure, a 450-Btu., 0.7-specific gravity water gas at 3.5 inches pressure, and a 550-Btu., 0.37-specific gravity coke oven gas at 3.5 inches pressure, results could be obtained that would be indicative of appliance operation under the most extreme conditions of service.

In addition to tests for completeness of combustion, under the above conditions, it was decided that pressure variations of 50 per cent above and below normal should be used to insure a wide degree of flexibility in meeting varying pressure conditions. Therefore, tests were specified under the most extreme conditions that appliances are ordinarily called on to meet anywhere in the country, so that appliances complying with such requirements would prove even more satisfactory under usual service conditions.

Committees interested in the development of combustion requirements have always felt that the production of carbon monoxide should not be permitted during the operation of an approved appliance. At the time this subject first came up for serious consideration, apparatus for the detection of this gas was not nearly as accurate as it is at the present time, one part of carbon monoxide in 1000 representing the greatest sensitivity obtainable. However, with the aid of machines recently developed by the U. S. Bureau of Standards and the U. S. Bureau of Mines, it is now possible to detect concentrations of carbon monoxide as low as one part in 1,000,000, and to determine it accurately in amounts as low as two parts in 100,000.

Most of the requirements dealing with completeness of combustion have been prefaced by the notation "no carbon monoxide shall be produced." Interpreted literally this means that one part in a billion or even in an infinite number of parts would not be permitted. Such a requirement, however, would obviously be ridiculous, for such quantities and often much larger ones are present in the air that we breathe. The research work summarized in the tables prepared by Henderson and Sayers, Meriwether, and Yant, clearly indicates that it would be absolutely unnecessary to propose any such high degree of refinement.

In establishing the requirements the various committees took into consideration the relative degree of hazard connected with the operation of each appliance.

Therefore, the combustion requirements differ for various appliances on account of their different methods of use. Thus it is that the requirements for space heaters are exceedingly strenuous whereas those for gas ranges, which are more or less intermittently used, are less severe. For water heaters and central house heating appliances, which are normally connected to a flue, higher concentrations are permissible than for space heaters. All such requirements and their methods of derivation, some of which are rather complicated, are set forth in the various A. G. A. Approval requirements, copies of which can be secured either from the American Gas Association, Inc., 420 Lexington Avenue, New York, N. Y., or the American Gas Association, Inc., Testing Laboratory, Foot of E. 62nd Street, Cleveland, Ohio.

PREPARATION OF OTHER REQUIREMENTS

To ensure safety of operation there remained further to establish requirements for fire hazard, leakage, and explosion.

The requirements for fire hazard were adopted from data established by the National Board of Fire Underwriters. These standards are expressed in the allowable rise above room temperature when the appliance is operating in a partial enclosure formed by two walls and placed six inches from each. The limit is 90 degrees Fahrenheit above room temperature, which is far enough on the side of safety to meet satisfactorily an occasional improper installation.

Requirements for many constructional details governing the minimum seal, both vertical and circumferential, and take-up for gas cocks, as well as the tightness of other parts were made to insure against leakage of raw gas. Every appliance meeting the approval requirements of the American Gas Association must be provided with or have incorporated in its construction an explosion relief which, in the event of an accidental explosion, will provide every reasonable precaution to prevent injury to the user.

There are also many other requirements which a domestic gas appliance must meet in order to receive the approval of the American Gas Association. Gas ranges, for example, must successfully pass more than 160 tests, 90 per cent of which are to insure appliance safety. The requirements for tests other than for safety from carbon monoxide are prepared by sub-committees composed equally of gas company members and members manufacturing the types of appliances for which the requirements are being prepared.

In the preparation of all requirements the necessity of providing every opportunity for manufacturers to improve or better appliances and to embody individuality in their construction is carefully considered. It has been the constant aim of each committee to avoid retarding progress that would in any way effect greater convenience and safety or economy in the cost of production.

Before being adopted, requirements are submitted in tentative form to the entire gas industry for criticism and, after final adoption by the A. G. A. Approval Requirements Committee, following a tentative period of from six months to a year, become mandatory. In this manner approval requirements have been prepared for flexible gas tubing, gas ranges, space

heaters, water heaters, and central house heating appliances. At the present date tentative requirements have been issued for hot plates and laundry stoves, and others for clothes dryers and incinerators are under consideration.

Because it is difficult to obtain the best performance from gas appliances unless they are properly installed, the American Gas Association has also prepared and issued tentative requirements for house piping and appliance installation. These are so written that they are applicable nationally and are sufficiently general in nature to permit the continuance of local policies that are in accordance with generally recognized rules of good practice. They specify general rules to be followed and present recommended methods for placing such rules in effect.

Along with its efforts to improve the standard of appliance construction and operation, the industry has given attention to the best methods of resuscitating persons from asphyxiation. During the year 1921 a special commission of medical authorities was appointed and charged with the duty of investigating resuscitation measures then available and of recommending the best first aid and resuscitation measures in the cases of gas asphyxiation.

In 1923 the Commission made its final report which outlined the experiments performed, and recommended the Schaefer Prone Pressure Method supplemented by the use of the oxygen-carbon dioxide inhalation treatment under appropriate circumstances.

The Commission also tested and gave its approval to certain inhalators designed to administer the carbon dioxide inhalation treatment.

More than 200,000 copies of the recommendations of this Commission have been distributed and its work has been a tribute to the foresight of those who were instrumental in its formation.

The work accomplished by the Commission may be divided into two definite parts. The first dealt with the general status of the problem of resuscitation from gas poisoning, together with an analysis of certain features of resuscitation as then practiced which were felt to be poorly understood and possibly harmful. The second and more important part of the work referred to a new and more efficient means of resuscitation, viz., the inhalation treatment utilizing oxygen-carbon dioxide.

Since the final report of the Commission, field surveys have been made to determine the efficiency of the oxygen-carbon dioxide inhalation treatment for resuscitating persons overcome by asphyxiation, which confirm the effectiveness of this treatment.

In the belief that with the growth in the use of the Schaefer Prone Pressure Method nationally, uniform training of employees would result in a greater saving of human life, the Association has been active in urging the preparation of a standardized text describing the application of the Schaefer Prone Pressure Method. This movement was conducted under the auspices of the United States Public Health Service and agreement has recently been reached on a standardized text by eleven national organizations interested in this subject.

APPLICATION OF REQUIREMENTS

The various requirements are applied for the gas industry by the American Gas Association, Inc., Testing Laboratory established at Cleveland by contributions from members of the Association. It was located in Cleveland because this city is near the geo-

graphical center of the gas appliance manufacturing industry and because it has so many base gases available for testing purposes. It is the most completely equipped gas appliance testing laboratory in the world, and contains many delicate and accurate instruments which, in the hands of a staff of trained testing engineers, make possible the most accurate determinations desired.

To determine the concentration of carbon monoxide in the products of combustion of gas appliances under test, the Laboratory uses the most sensitive and accurate instruments known, namely, the iodine pentoxide apparatus, the carbon monoxide recorder, and the conductivity carbon monoxide and carbon dioxide apparatus. With the aid of these instruments it is possible to detect carbon monoxide accurately in concentrations as low as two parts in 100,000. Much of the Laboratory's equipment has been developed by the Laboratory to apply with a greater degree of certitude the approval requirements for safety and efficiency in gas appliance performance.

Appliances are submitted by manufacturers to the Laboratory for test in accordance with the approval requirements. If an appliance is approved, the manufacturer is permitted to display on it the Laboratory's copyrighted seal of approval, which consists of a circumscribed blue star, and the model is listed on the Laboratory's "List of Approved Appliances" furnished all Association members. This list is revised and issued each month. By this means the industry is kept informed of all appliances having the Laboratory's approval, and the Laboratory is able to recognize and correct any unauthorized use of its approval seal. Approved appliances are further identified by "Certificates of Approval" issued by the Laboratory.

Approval is granted an appliance for one year only—that indicated on the face of its certificate of approval. Approval is extended at the beginning of each year only if the appliance is found, by an inspection at the factory or in the field by a Laboratory representative, to be of the same construction or superior to that originally passed by the Laboratory.

The ultimate result desired by the gas industry—and one which is not incapable of attainment—is that, by the adoption of its approval requirements and the establishment of an agency to stamp meritorious gas appliances, it will eventually become impossible to purchase any domestic gas appliance not certified as safe, efficient, and reasonably durable.

By this means, the American Gas Association hopes to have taken a big step toward the realization of its aim to "serve to the fullest possible extent the best interests of the American public."

The Present Status of Standards in the Electrical Industry

By C. E. SKINNER

Chairman, American Engineering Standards Committee, and Assistant Director of Engineering, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

THE electrical industry, while less than half a century old, is one of our greatest industries and its phenomenal rise has been due in no small measure to the early adoption of fundamental standards. It is an outstanding example of the fact that proper standardization does not hinder but aids development. In every industry, and particularly in those which undergo rapid development, a very wide variety of devices, methods and practices are tried out, before the survival of the fittest indicates the direction which detailed standardization should take. It is of incalculable benefit, however, to such an industry to have the fundamentals underlying that industry stabilized by standardization at an early date. Fortunately for the electrical industry, the American Institute of Electrical Engineers early undertook such standardization, organizing their first Standards Committee in the year of 1898. Their early work was devoted to the arriving at standards governing the basis of rating, basis of test requirements and similar items.

DEVELOPMENT

In the rapid development of the electrical industry, however, many divergent practices deemed necessary at the time were developed, which in the light of later developments were found to require modification. The Standards Committee of the American Institute of Electrical Engineers has in the past been the leader in developing and adopting standards, particularly those which relate to fundamental practices. The Bureau of Standards in Washington, in coöperation with foreign countries, has done its part in the establishment and maintenance of fundamental units used in the industry, such as the volt, the ampere, and the ohm.

Of later years, trade associations of the manufacturers and the users have arisen, which have found the establishment of certain additional types of standards to be a major service to their groups. Meanwhile, electrical devices have found their way into almost every possible phase of our modern life with its ever increasing tendency to complexity. The development of new uses for electric current and new applications of electrical devices has gone forward in geometrical ratio. All of this makes it more and more necessary to carry on a continuous program of standardization in the electrical field to prevent utter confusion in all of those phases of the electrical art, which touch our daily life. Much has been done in the past to provide us with our common devices and to insure common practices which shall give the maximum service efficiency at a minimum of cost. Much remains to be done. We are much more fortunate on the whole, perhaps, than our European friends, due to conditions and practices which will be briefly outlined.

In the beginning of an industry, the standards are very largely governed by the manufacturers, and fortunately for the United States there were few manufacturers engaged in the production of

electrical apparatus so that relatively few voltages, frequencies and types of systems found their way into service. Primarily, electric current was used mainly for lighting, and the distributing voltage for lighting curcuits was fixed in most of the early plants at 110 volts. There were various types of apparatus and methods for the producing of electric arc lights, but these have practically disappeared with the advance in the incandescent lighting art, so that they need not be considered. With the manufacture of carbon filament lamps, it was found impossible to make all lamps, or even a very large percentage, suitable exactly for a given voltage, and consequently, the practice grew up of sorting the lamps to their best operating voltages. Different districts in the United States were asked to adopt voltages varying from the initial standard of 110 in order that economical use of the lamps thus produced might be met. This brought about a considerable number of voltages varying by a few per cent from the originally adopted standard. In addition, certain variations were made for reasons of economy in wiring, or for maintaining satisfactory service. With the advent of the metal filament lamp, the difficulty due to variation in lamps disappeared, removing this obstacle to a universal standard distributing voltage.

VOLTAGE STANDARDS

At about the same time, household devices of many types and varieties began to appear. These required for their economical manufacture in quantity, the closer adherence to a given voltage. This was particularly true of those devices such as certain heating devices, whose performance varied widely with a small change in delivered voltage. Furthermore, the devices, such as transformers which supply the service circuits would be simplified by the adoption of a standard voltage. These considerations and others, perhaps less important, led to an extended study of the delivered voltage situation with the result that a few years ago, the standard of 115 volts for distribution circuits was adopted with 110 and 120 as recognized departures. Recent studies indicate a rapid decrease of the number of distribution systems employing 110 volts and a considerable increase in the number of 115 volts and a slight increase in a number of those employing 120 volts. This has made it possible for the manufacturers of lamps to largely concentrate on these three voltages and has been of very great benefit to the manufacturers of those devices, used in large quantity, which are sensitive to voltage conditions. Certain devices used largely on distributing circuits, particularly in household service, operate fairly satisfactorily over the entire range, but naturally each has its best particular operating voltage. It may be said, therefore, that we have been rapidly arriving at a standard which may possibly become universal throughout the United States for distributing voltages which are supplied to the mass of our people and particularly for their lighting and domestic appliances.

In general, as a matter of convenience and economy, the voltages for appliances using more power than the usual household device, particularly motors, have usually been a multiple of the distributing voltages for lighting, that is, if 115 is the standard lighting voltage, the motor voltage from the same system would be 230; distributing voltages for factories, mills and still larger users might be still higher. Unfortunately, from the viewpoint of standards, it has been found in recent years that wiring systems, particularly in congested districts in the cities, can be improved with regard to continuity

of service and cost of instal ation, by a modification of connection such that, with standard lighting voltage, the motor voltage available becomes an off-standard, or vice versa. For example, with 115 distribution voltage for lighting and general household appliances, the motor voltage on these new networks would be 199. This brings in a new phase of the question in which the previous standards may possibly require additional standards in the interest of matters which outweigh the value of maintaining a single standard. The motor standard outlined above may have to be changed for densely populated districts, while the old standard would remain for outlying and less congested areas.

All of this must eventually be tied up with the whole distributing system from the utilization device back through the secondary distribution, through the primary transmission and to the generating stations. The interested parties, that is, the public utilities, the electrical manufacturers and others, are attempting to bring about an orderly set of standards of voltages from the generating station through all of the transmission to the individual users' premises. There is a vast amount of engineering involved in this simple requirement, but there is every evidence that this most desirable object will be achieved at least to a degree which will provide for a more orderly procedure in the manufacture and installation of electrical machinery and devices.

In Europe there are many distributing voltages, but the more usual standard is 220. Consequently most utilization devices satisfactory on circuits in the United States will be destroyed if it is attempted to use them on many European circuits. Numerous instances of burned-out curling irons, smoothing irons, etc., carried to Europe by American travelers are on record.

ALTERNATING CURRENT

Alternating current has become almost the universal kind of current used for the general distribution of electrical energy. Its ascendency over direct current distribution is due to the facility with which it may be changed from one voltage to another and the fact that utilization devices employing alternating current have been developed for almost every possible application. Recent developments in the interconnection and extension of existing systems to cover very large areas so that any given point may be served by the most efficient generating station connected to the system, has resulted in very great economies in distribution and transmission and has insured a continuity of service such that outage at any given point is now a very rare occurrence. This interconnection is made possible, due to the fact that in the United States we very early standardized on two main frequencies, namely 25 cycles per second and 60 cycles per second. Numerous other frequencies were adopted in the early days but, with the exception of a very few 50-cycle plants, these have all disappeared. In the early development of certain apparatus, such as the rotary converter, it is found difficult to design these for satisfactory operation on 60-cycle circuits, and this is the main reason for the adoption of the 25-cycle circuits. Later this design difficulty was overcome and in the distribution systems in the United States, 60 cycles very largely predominates. Twenty-five cycles is still found necessary for direct application of alternating current to railway electrification.

STANDARD FREQUENCIES

The adoption of standard frequencies has made it possible to manufacture equipment suitable for these frequencies which can be used in prac-

tically any part of the United States. A multitude of frequencies would have made interconnection of systems as practiced at the present time, sometimes over areas of many thousands of square miles and transfer of power over hundreds of miles, economically impossible. Interconnection in systems of different frequencies may be made by use of frequency changers, but these are expensive and are used only in certain limited applications.

In Europe there are many frequencies in use, but the prevailing standard is 50 cycles in place of our 60 cycles and, for railway and similar work, 16⅔ as against our 25. In the city of London, alone in the past, there have been a large number of relatively small plants different both in frequency and voltage, and this has done much to retard the use of electrical devices in the London area. If one moved from one district to another, an entirely new set of devices might be required. Plans are on foot for adopting a standard voltage and frequency for this district which will mean the scrapping of much of existing equipment.

STANDARDIZATION OF LIGHTING DEVICES

In the beginning of the incandescent lighting industry many types, styles and varieties of lamps, bases and sockets were developed. The standardization of lamps, bases and sockets, has proceeded to a point where we now have but one base and socket for all ordinary incandescent lamps, and a recent further standardization reduced lamp sizes for ordinary work to five. This has made it possible for the manufacturers of these devices to turn them out by hundreds of millions per year, with a constantly increased efficiency and a more or less constantly decreasing cost to the customer. The cost of illumination in terms of current purchased by the householder has, through this standardization and through increased efficiency of illuminating devices, been almost constantly decreased, since the beginning of incandescent lighting.

There are, of course, additional types of lamps, such as miniature lamps, automobile lamps, high-power street lamps, etc., and these require both smaller and larger sockets and bases than the general standard. These are also rapidly approaching standardized forms in the fewest possible number. A lamp manufacturer in Europe reported that he was required to make over 70,000 sizes, types and varieties of incandescent lamps in order to service the general European trade. This, of course, includes every variation in size, voltage, type of base, color of glass, etc. This makes a very difficult manufacturing proposition.

THE NATIONAL ELECTRICAL CODE

Very early in this country the Underwriters' found it desirable to require a high grade of electrical construction to lessen fire risks in insured properties. The National Electrical Code is the result of this work and this Code, revised and brought up to date from year to year, largely governs electrical installations, especially wiring and wiring devices throughout the United States and Canada. This Code really sets a standard which has been of very great benefit to the whole electrical industry, providing as it does for safe practices, thereby giving confidence in the use of electrical devices.

The National Electrical Safety Code, of more recent origin, does the same service to industry with regard to the life hazard as is done by the National Electrical Code with regard to the fire hazard. With the application of electricity to almost every service in industry and in our homes, it is evident that

such standards guarding the fire and life hazards are essential. These standards have done much to standardize the devices and materials used in wiring construction, and this again has been of great benefit to both their manufacturers and users.

PRACTICAL STANDARDIZATION PROJECTS

During recent years, the work of the standardizing groups in the electrical industry in the United States has been extended to the bringing about of practical standards covering the majority of the general types of electrical apparatus made and sold. The national engineering body in the electrical industry, namely the American Institute of Electrical Engineers has been the leader in these standardization projects. Trade associations, such as the National Electrical Manufacturers Association, the National Electric Light Association, the American Electric Railway Association, the Association of Iron and Steel Electrical Engineers and others have taken part in such a standardization or have had standardizing projects of their own. These standards include nomenclature, definitions, bases of rating and tests, dimensional standards and many others. Many of these standards have been submitted to the American Engineering Standards Committee for the stamp of approval as American Standards. This standardization work has involved an immense amount of time, labor and expense, but that it is deemed essential to the advancement of the electrical industry is evidenced by the support which has been given by all parties at interest to this great standardization movement.

PROGRESS IN THE INTERNATIONAL FIELD

In the international field, the International Electrotechnical Commission, organized a little over twenty years ago, has done much to bring about international accord, particularly in arriving at those fundamental standards of units, bases of rating, and such other items as make it possible for a purchaser in any country to intelligently prepare bids for equipment made in accordance with the specifications of any other country. This international work has included in addition to those items which are fundamental in the evaluation of the rating of electrical machinery, such items as the standards of prime movers for driving electrical equipment, and the rating of rivers with regard to their power resources. At the World Power Conference in 1924, most of the power using and power producing countries of the globe gave estimates of their power resources. In many cases, water resources were not comparable, due to the fact that the rating of water powers was estimated on different bases. The effort originating in America and sponsored internationally by the International Electrotechnical Commission to arrive at a definitely understood method of rating of rivers and water powers the world over will make it possible to make direct world wide comparisons along this line.

GENERAL VALUE OF STANDARDIZATION

Standardization in any line is of value to all parties at interest, that is, the producer of devices and machinery involved, to the producers of distributors and especially to the ultimate users. In the electrical field, standardized voltage frequencies, types of apparatus, standard ratings and dimensions, make it possible for the manufacturer to produce in quantity at minimum cost, devices of maximum efficiency and quality. It permits the public utility to purchase the apparatus necessary for the production and distribution of electric current at mini-

mum cost and of a type which will be suitable in any situation which may arise. It makes possible for the user of electric current and electrical devices to secure the best possible and of the type which may be utilized on practically any circuit in the United States. It is impossible to estimate the money value of the standardization already accomplished, but it may be said without fear of contradiction that the use of electrical current and devices in this country in far greater measure than any other country of the world is in no small part due to the standardization already accomplished. There has certainly been no detrimental effect on the development of the electrical industry by this standardization and the extensive work planned for the future is ample evidence of the value the industry as a whole places on standardization.

Standards in the Printing Industry

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In approaching the above subject it seems necessary that we consider it from a most liberal angle, which is at the same time from an engineering point of view.

First, to avoid misunderstanding, let us define our subject according to Webster:

1. A standard is that which is established by authority, custom or general consent as a model or example; criterion test.
2. Printing is the act, art, practice, or business of one who, or that which, prints; typography.
3. To print—to stamp or impress with characters, patterns, or the like. Transferred by pressure from plates types, etc.
4. Industry—any department or branch of art, occupation, or business, especially one that employs much labor and capital.

From this printing can be classified as an industry, although we have heard it debated that the large number of establishments, 21,000 in all, would not allow it to be considered as such. But more important still, we establish the fact that a standard is that which is established by authority, custom or general consent as a model; furthermore, that printing classes as an art. It is upon these facts that we will base this article.

Unlike most industries the printing industry serves as an adjunct or supplement. It is dependent for the most part on general industrial conditions, for printing is a medium of expression that reflects and fosters these general conditions. On the other hand, "The Art preservative of the arts," as it has often been called.

It is through printing first that we have a record of History, of Literature and of Art; without printing there would be little learning. There would be no trade. Civilization could not have advanced. Business could not have developed. Advertising would be unknown. Its importance, therefore, cannot be denied, and its value must be given full appreciation—its standards understood.

Standards in Printing

The first and most important standard in printing and the standard to which perhaps the least thought is given is the standard of typography. The second standard of printing was laid down by our early printers, the standard of quality, or shall we say permanency or value? It seems proper, therefore, that we should not overlook these two standards: first, the standard of typography and, second, the standard of quality, permanency or value. And since a standard is that which is established by authority, custom or general consent, we must understand what this model is.

History and Expansion

Between 1448 and 1456 John Gutenberg, a citizen of Mainz, was engaged in printing a book that has been called either the *Mazarin, The Forty-Two-Line,* or the *Gutenberg Bible.* This book comprises two volumes of 1282 pages 16½ by 12 inches. There are forty-one copies in existence today. The letters are Gothic in imitation of the prevalent manuscripts. The quality of the printing established a standard. It meant the death of the Scriv-

ener within half a century. (Its money value today is approximately $200 a page.)

Gutenberg was financed by Fust, a Jewish money lender, and aided by Peter Schoeffer, who later married Fust's daughter, Christina, and became the most distinguished printer in Germany. The probabilities are that Gutenberg was an indifferent executive, for the *Gutenberg Bible* is believed to have been completed by Schoeffer. The firm of Fust and Schoeffer published in 1457 a psalter considered by many as an outstanding book in the annals of typography. The initial letters imposed in two colors, red and blue, are registered with such accuracy that expert typographers disagree as to whether they were stamped or printed. The high character of quality is a credit to the executive ability of the master craftsman, whosoever it was that completed the work. And yet there is no doubt that these two early works were the result of an effort to earn money.

The process of printing was kept a secret from the world until 1462, when Metz was sacked and the employees of the firm of Fust and Schoeffer took their knowledge to other parts of Europe.

In spite of obstacles imposed by Scriveners, Church or State, the early growth and spread of the printing craft was rapid. This can be understood better from a more detailed account.

In Germany by the end of the century there were 16 master printers in Strassburg, 22 in Cologne and 20 in Augsburg.

The Netherlands claimed 21 towns with printing establishments, France 31, Italy 32 and Spain 21.

Printing grew into a thriving craft within a period of forty years primarily because it met with an economic demand.

During the succeeding three centuries the printing craft and trade expanded in size, but showed a tendency to confine itself to the printing of books.

The early plant usually utilized a press made after the fashion of an old wine press. The "bed" of the press was immovable. The form was laid face upward upon it, and when the sheet of paper was placed over the inked form the screw was turned and the movable plate came down upon the paper, making the imprint. Although the type was made of tin or copper, the immobile base beneath it made it necessary for the printer to be extremely cautious in applying the pressure from above in order to prevent the crushing of the type. Yet the early printers showed great skill in manipulating the device, for their volumes, especially books of early Italian printers, show that the imprint was registered on the sheets cleanly and with equal margins. Books were bound in boards the thickness of a door panel. Designs were studded on these covers with brass tacks or engravings. It is little wonder that Erasmus once said of Thomas Aquinas's *Secunda Secundae*, a rather long work, "No man can carry it around with him, much less get it into his head."

Master craftsmen controlled printing until about 1600—but even then the domination of the publisher became apparent—as illustrated in the great Leyden firm of Elzevir that published what has been called the Everyman's Library of the Seventeenth Century.

The house of Elzevir is generally associated with decadence in the quality of printing. Here we find business interests neglecting quality because the executives knew and cared little about the technique of printing. To compare the product of the Elzevir firm with that of Fust and Schoeffer, it must be done first on a basis of spacing, leading,

indentation, ink, paper, imposition—design and decoration—and then how well does the work fulfill its purpose?

In a background where relief printing, paper, printed books, wood engravings and the idea of movable types already existed, "Gutenberg's invention consisted apparently in making brass moulds and matrices by which type could be cast in *large quantities*," as brought out by Updike in his authoritative book, *Printing Types*. Thus the Gutenberg legend is reduced to a successful demonstration of a mechanical means for the reproduction of manuscripts. Use of the principle of typography, then, movable metal type cast in a mould from a matrix, is the beginning of printing as we know it today.

Principle of Typography

Since the days of Gutenberg the principle of typography has been improved upon in detail only. In theory the principle of typography is essentially the same. Today it remains an integral part of all branches of the printing industry from the printing of books to the manufacture of postage stamps. Using the term in its broadest sense, which includes the planning of printing, typography is the key to the study of all phases of the industry today. Its relation to advertising has emphasized its commercial importance to such an extent that trade papers refer to it as a profession.

Mr. Updike's significant comment adjusts our point of view, "Typography is an art and Typography is a trade; not to face these two facts or to neglect either one of them is merely to fool one's self."

The history of printing, however, reveals few typographers worthy of the name of artist. For as an art it has been and is understood by few. John of Spira and Jenson were innovators in changing Gothic type to Roman in 1469 and 1470 respectively. John Day followed their example almost a hundred years later in England. Aldus, in 1501, is said to have invented the italic; the Earl of Ratdolt, the first title page in 1476; while Platin used the engraved title page for his famous Polyglot Bible in 1572. Garamond in France specialized in type cutting about 1540, and Caslon is known as the great English type founder of the eighteenth century. The Italian, Bodoni, designed the "Modern Face" type in 1789. Bruce Rogers and Mr. Goudy are outstanding in American type design. There are many more whose names should be bywords with printers: Caxton, Pigouchet, Estienne and Froben. Many works should be known as well: woodcuts for the *Nuremberg Chronicle* of 1492 by Michael Wohlgemuth and Wilhelm Pleydendorf, woodcuts by Albrecht Pfister of Bamberg, woodcuts by Laboureur—engravings from Boucher, Burne-Jones, Gravelot and Eigen. In short, decoration from the *Hypnerotomachia Poliphili* of Aldus to the Locomobile ads of T. M. Cleland—the *Saturday Evening Post*, the *Gazette du Bon Ton*, or the *Blatter fur die Kunst*.

Like Geoffrey Tory, artist, scholar painter in sixteenth-century France, William Morris in the last decade of the nineteenth century did much to elevate the standards of quality in printing. His influence is felt today on the continent, at home in England, and in America.

Quality of Printing

To maintain and surpass the quality of printing as set by standards of the past is a worthy aim. It can be accomplished through a more widespread appreciation of typography. A better understanding between the producer and consumer of printing is required. To a large extent the public is in itself

the criterion of taste, but we underestimate the average intelligence. We all admire a beautiful building, but when we build, our work does not usually qualify as an outstanding example of architecture. Most of us obtain a great deal of satisfaction out of a perfectly appointed room—one that has the comfortable feeling of home and yet has enough in quality and taste to make no error. Perfection in any art is but a fleeting hope—unless systematically studied and attained. So it is with typography.

Typography is but typesetting—architecture only drafting. And yet typography is an art to be enjoyed and taught.

A discussion of art, however, enters upon an ephemeral field. In a comparison between the *Gutenberg Bible* and a book produced by the Elzevirs, we have the common basis of typography. We find that the quality of printing in either case is dependent upon the executive in charge of the individual plant. In general since 1600 the quality of printing has suffered, because since 1600 the printer, like his trade, has been dominated by other interests. A higher order of executive is essential to a higher order of quality in printing.

On the other hand, many have been employed in typography as a trade, a fact that gives point to the words of Antoine Vitré, favorite of the famous Cardinal Richelieu:

> Letter founders call themselves publishers, printers, and binders because they cast letters for books. I tell them that the calf has about as much right to call himself a publisher because he furnishes the skin for the binding.

This witticism from the seventeenth century is indicative of a general change in the printing industry—the advent of specialization.

Subsequent development in printing has been along the line of specialization. This fact must be considered in applying the word quality to printing as an industry.

We have discussed the two primary standards of printing, that of typography and that of quality. From tradition we find the principle of typography—movable metal type cast in a mold from a matrix—is the basis of all printing. In the history of printing, only a few typographers excel.

The quality of printing is dependent upon the individual or group of individuals who control the manufacture (men, material, equipment) and marketing of the finished product. In general since 1600 the quality of printing has suffered, because of the subjection of the average printer.

DEVELOPMENT IN THE PRINTING INDUSTRY

The last thirty years have shown a remarkable development in the printing industry, and the recognition of the value of standards has been definitely shown. Great credit is due in this development period to many outstanding men and concerns, particularly in the field of printing equipment. Each large manufacturer of presses, of typesetting machinery, the type founders, the manufacturers of big bindery machines and other binding equipment, including folders and automatic feeders, have played their part. Farseeing printers have shown remarkable development, and to these we owe our inspiration and hopes for the future. We must as well recognize the manufacturers of ink, the large and progressive paper mills, the trade publications in the printing industry, the United Typothetae of America and the men in this organization who have devoted themselves unselfishly to their work. The United States Department of Commerce, the Bureau of Standards and the

Government Printing Office have also played their part, but the surface is barely scratched when we consider conditions existing today from an engineering standpoint.

The foregoing serves to tell us something of the history of printing through the centuries. The present is but a fleeting moment; the future, however, stretches before us as of outstanding importance.

STANDARD OF MANAGEMENT

A standard or model of management is the industry's greatest need. The thinking printer, leaders in the printing industry, realize this. But unfortunately the thinking printer or the leader is the exception. The average printer may point out this or that example—here or there where a man by his dominant personality has made a sensational success. The average printer, however, fails to realize that this or that man whom he cites would be successful in any enterprise—by virtue of his dominant personality. Such printers are very much like Napoleon and his Empire. The fall of Napoleon meant the fall of the Empire. Just so with printers where organization is subservient to personality: only too often the death of the man at the head has caused the dissolution of the business. Unfortunately too many successful printers are of this type. And therein is the need of a more general recognition of a standard or model of management. The institution established by such a personality outlives its founder only where the value of engineering is recognized and applied.

The maintenance of a standard of quality—the future of printing as an industry or, briefly, the establishment of a standard or model of management—depends upon a more general recognition of the value of engineering—a knowledge of what engineering really is. With this in view we will discuss the present status of printing, as well as its needs for the future.

It is important when criticising, whether this criticism be of the individual, company, companies, group of companies or an industry, that our criticism should not be destructive. We must, therefore, have in mind a remedy that our criticism may have some constructive result.

MAGNITUDE OF THE INDUSTRY

In order to realize the magnitude of the printing industry it should be noted that the printing and publishing industry consumed raw material valued at $610,059,000[1] and added to this, by manufacture, the value of $1,659,579,000 to produce total products valued at $2,269,638,000.[1]

The printing and publishing industry today has 21,000 establishments. The industry ranks fifth in the value of the total products sold, although actually, it ranks first in the amount of value added to the raw product in the period of conversion. It therefore in all probability has the highest payroll of any industry in the country.

Just consider for a moment the fact that the automobile industry, which ranks first in value of total product sold, although with a somewhat smaller payroll than the printing industry, has but 279 establishments as compared to 21,000 in the printing industry.

STANDARD OF MANAGEMENT NEEDED

In 21,000 printing establishments in the United States today, large plants and small, doing newspaper, magazine, book and job work, *management* is the most variable factor. Individual plants offer examples that range from best to worst. The average plant offers a low order of management. In 1921 a survey made by the Federated

[1] U. S. Census, 1925.

American Engineering Societies, on the elimination of waste in industry, found 63 per cent of the determined waste in the printing industry due to this low order of printing management.

On the other hand, many have said that the printing industry is over-equipped—meaning that the industry has lacked executives who can sell the full production capacity of their plants; more specifically many have said that the industry is overequipped (a way of saying undersold) from 50 to 150 per cent.

But that percentage of the equipment the farseeing executive will destroy as soon as it is obsolete and unable to properly perform its work. What man would continue to run a 1919 truck, if clear-headed observation would teach him that he could replace it with a 1928 truck at a financial gain to himself and a better service to his customer? This is a serious problem that management alone can solve.

From our analysis of the situation there are five types of men who head the various printing plants, small and large.

The first and most commonly found is the mechanic—the man that has grown up in the industry. He worked up from the bench, he has served as foreman, superintendent, perhaps as estimator. He is the "inside man"—the man who has all details at his finger tips, and yet he still is a mechanic.

The second type, to be found in increasing quantities due to the increased development of advertising printing, is the so-called "super salesman." He knows little and cares less about the mechanical end of the business. He knows enough, however, to talk intelligently and convincingly about his plant and its ability to deliver. He is right in his contention that he can employ men to supervise the mechanical end of the work much better than he can do it himself, and he recognizes that without sales the plant becomes an unnecessary adjunct. He is apt, however, in the majority of cases, to allow his plant to become the servant of his sales organization. This is demoralizing to management and profits.

The third type of man that we find generally in the printing industry is the man who finds himself in the business because his money is in it. He may have bought into the business or may in some other way have been brought into it against his natural inclinations. This type of man is successful or unsuccessful, depending directly upon his ability to organize or have his business organized for him. Our advice to such men is always: hire the best man available to operate this business for you, unless you yourself are thoroughly capable and can show a profit; otherwise sell out and give a chance to someone who has the ability and the desire to make a go of it.

The fourth class or type of printer is the artisan or craftsman, the man who is in the printing business because of a love for the business as a definite objective. Such men are students of their profession and have an object in life. They are primarily organized to serve their customer with no definite desire to make tremendous profits. Because of the service they render and the needs they meet, they usually find a resulting profit. But many fail, because in this class of men are many dreamers and impractical men of artistic temperament who do not see the wisdom of associating with them practical superintendents or clear-headed accountants, the wisdom of engineering.

Fifth: the last and rarest type of printer, but the most successful, is the man who combines all of the good qualities of the above four types of

men with, as well, a recognition of the value of engineering. He recognizes the necessity of securing, at whatever cost, men with the above qualifications to hold important and responsible positions in his organization and thus make up for his own shortcomings. He will be successful in the printing industry or, in fact, in any other industry. The retention and addition of such men to the industry are of prime importance.

The immediate question of any printer will be, how can the present printing plants, having difficulty in making profits, afford to hire such a man? Unfortunately, it is because of such reasoning that many businesses never progress. Without profits we cannot afford to increase our expense, they say, and, unless we increase the expense, we must look forward to a business with diminishing profits. It is far better to suffer the immediate loss, which is inevitable, with a high chance of increasing returns than to face a continued period of diminishing returns.

ENGINEERING, A MEANS TO A MODEL OR STANDARD

Another requirement of the printing industry is the general recognition of engineering and the knowledge of what engineering really is. The most common question which is asked us by buyers of printing, and it is probably more generally asked than any other question, is, "When a bid is submitted by four or five printers, why do the prices submitted vary 100 per cent or more?" This question, although little recognized as such, is a question which must be solved by engineering. We have known of instances where prices have varied as much as 100 per cent even where exactly the same system of costs is used. We all know that the same system of costs is not used in a very large percentage of our plants. The United Typothetae of America report that approximately 25 per cent of the printers in the United States use the same general system of costs, the other 75 per cent vary in cost systems sufficiently for us to state that there are thousands of different ways of figuring costs. Even the 25 per cent that maintain their costs under the U. T. A. system have certain variances because of peculiarities of individual requirements and ideas.

Assuming that four printers use the same cost system, they submit a price on the same job. The first item on the cost blank is the item of paper. The printer is requested to duplicate a certain sample. At the outset, considering that paper amounts to one-third of the job, there is a possibility of immediate variance entirely dependent upon the ability, time afforded, and previous experience in this particular class of paper of a particular individual in a particular printer's plant involved.

The second item of costs on the particular job is composition, and whether we recognize the fact or not, an estimate is in all cases a guess, and a man who guesses on composition is almost always wrong in his analysis of any *particular* job which his plant has not actually handled.

The third item of cost, in most cases the most important, is the cost of the press work. This is a matter that presents to an estimator a considerable difficulty. The job may be ideally suited to certain size presses in certain plants. Those presses may not be available in other plants, and may be available in that plant only at the time the estimate is made, due to a changed condition at the time the job goes to press. Thus the price may be figured on one size presses with an extra allowance to cover the possibility of change.

The printer, on the other hand, may

have automatic feeders or automatic presses which will print the job at higher speed with fewer plates. Here again we find great variance in price. Allowances for lockup and make-ready are apt to vary. The same general variance, sometimes even to a more marked degree, occurs in the bindery. Very few jobs offer anything more than a chance for a guess or estimate good or bad. Unfortunately, few printers have yet recognized the necessity of hiring estimators who are sufficiently capable to be habitually good guessers. The estimator's job can well be claimed as of equal importance with the job of superintendent or sales manager of the plant.

How would engineering help to clear up this situation?

Properly applied, engineering should tell us the best and most satisfactory way of doing any particular job. It should tell us, furthermore, whether the plant with which we are connected is capable of doing a particular job in the most satisfactory manner. It should assist us to determine those particular jobs for which our particular plant is best fitted. It should tell us what equipment we need or do not need in order to suit our plant to the particular requirements of the class of business which is available to us. The opportunity in fact that engineering has of eliminating wasteful effort upon the part of salesmen and estimators, as well as developing a plan and working out simplified and standard methods of overcoming waste, would occupy many volumes; we therefore must pass on to our next point.

THE PRINTER'S PART

The clear recognition on the printer's part of his position in this complicated industrial life of ours is vitally important. The automobile manufacturer understands that his job is to furnish the public with transportation. It was learned long ago that transportation must be standardized. There are very few people in this world that can afford custom-made bodies, not to mention custom-made chassis. It has, therefore, been put to the manufacturer to develop transportation facilities meeting the public's need. The printer's problem is as clear, and that is to convert what in most cases is paper into a printed medium for performing some particular function in our industrial and social life. That medium may be a periodical, a book, a newspaper, a broadside, a calendar, a check, a contract or, in fact, anything requiring paper, ink and type. The printer must not forget, however, that whenever a piece of printing is manufactured it is manufactured for some particular purpose, and if the manufactured article fails to fulfill that purpose that in this way the printer prevents his customer in turn from rendering the expected service to a third person.

There is in the present development of the printing industry a rush to develop tonnage. Little or no recognition is given to the value of this tonnage, and in this connection tons of advertising material are being sent out daily in the mails having little or no appeal and being of little or no value to the industry that is sending it out. Most of us will agree that the printer's hands are tied, and that he is simply the agent of the man who is sending it. This we must know, but we must also recognize that the failure of this literature to perform its purpose will ultimately act as a boomerang on the printer, for future printing from this customer will increase or diminish in direct proportion to the value of his printing and the service it renders him.

This general outpouring of useless literature, if encouraged by printers, is therefore leading him into a doubtful future. How can printers avoid this?

We may well ask, and in answer we say, he must clearly understand the part he plays. He must not develop his printing plant without a recognition of what the future holds for the industry at large. When he comprehends this, he will be a strong advocate of more useful advertising. He will discourage rather than encourage useless expenditures on the part of his customer. He will and must see the necessity and value of advertising advice rendered him and his customer by recognized advertising authorities. Printers can well refer prospective advertising customers to such authorities, for the better advertising agents of this country have developed an advertising philosophy and ability to analyze advertising requirements and situations to a very high degree and are in reality a vital adjunct to the printing industry.

The Relation of Costs

We discussed somewhat briefly the necessity of a better understanding of costs. We do not mean the necessity of an executive's understanding minute factory costs on a basis of each separate operation, neither do we mean that he is to continue figuring his costs on some fictitious basis of past experiences, nor upon a hypothetical condition that may never be expected to exist. A misconception of how cheap he can figure a job on any such basis is likely to eliminate him as a factor in the printing industry in a very short period of time. Costs hourly and otherwise must be based upon operating methods which could be reasonably expected under proper engineering control. This subject could also occupy volumes. We will, therefore, pass on, limiting ourselves to these remarks.

A New Sales Policy

We cannot overlook the necessity of a sales policy developed as a result of better management, better engineering, a knowledge on the printer's part of his own business and the part it plays in the industrial setup, and a better general understanding of costs and their relation to profits. At the present time, a very large majority of all printing plants are operated as "job" plants, and, in a very large majority of job plants, the factory is subservient to the sales manager; therefore, to the whims of the customer. As long as this condition continues to exist, profits in the printing industry are going to depend very largely upon "super salesmanship," so called. How long do you think an automobile factory or some similar business could continue to make profits should it have to arrange its production schedule on the whims of the buying public? How long could they continue to make a car at a price if they were to stop the output of the groups of cars a dozen or more times to hear the decision of the customer as to just what sort of gears he had decided to install in a particular group in question? How long could they continue to produce a satisfactory article if they were obliged, at every turn, to hold up production, to sit and wait for the return from New York or the golf links, of some man endowed with the power of deciding whether or not the wheel base should be extended or contracted? In other words, how long could the industry exist if the salesman or sales manager, in order to sell the output of the factory, disregarded all principles of good management and good engineering? And yet that is exactly the manner in which the great majority of the plants in the printing industry are operated. Successful printing plants of the future must operate on the basis of good management and engineering. It must be predetermined by the operating head of the plant just what business can be taken, when, and at what

price it can show a satisfactory return. The sales organization must bend its efforts to produce business in accordance with the predetermined schedule. Who receives the benefit? The answer is the same as in the automobile industry—the customer. He will receive a better article because it is better planned, better engineered and more properly manufactured, and it will be at a very materially reduced price.

THE PRINCIPLE OF SERVICE

Perhaps the most outstanding requirement of the industry is "service" on the part of the printer. Founded on an understanding and adoption of the first five principles, it is developed to meet the requirements of the customer. By service we do not mean something unusual: unreasonable delivery schedules, the ability to untangle indefinite specifications, or a lot of costly and unnecessary personal service, but rather a service which is based upon the customer's point of view. Such service requires a definite understanding of the customer's problem and a printing plant organized for the principal purpose of rendering the kind of service desired by the customer; better still, the development of an organization primarily keyed up to *serve* the customer rather than for the particular purpose of *making profits*. It is a well-known fact that street car companies who have understood that their principal requirement was to serve the public and furnish adequate transportation, even though it be necessary for them to add busses and other modern adjuncts to their ordinary equipment, have found it a paying proposition; whereas street car companies organized for profit with the general attitude of the "public be damned" have generally failed. To no small degree it has been the attitude of the public toward the company which has ultimately determined success or failure. So it is in printing—if the customer is encouraged not simply to feel but absolutely to know that the printer is organized primarily for his benefit, and if the printer has proven this time and time again by the service he renders, the attitude of the customer toward the printer is one of wanting the printer to make a profit. Without this profit he recognizes that the printer, an asset to his own business, cannot succeed. On the other hand, the printer who organizes himself primarily for profit and gives such service as he is forced to give ultimately fails in one or more directions and thus loses the confidence and the account of the customer in question. It therefore is our firm belief that printers or any other set of business men who are meeting in groups, or who are developing a philosophy towards their business and its future, should come to a recognition that service is the demand of the future, and that in developing the ability to render a service they are automatically assuring their future profit.

The last and by no means the least requirement is the necessity of a common recognition, understanding and adoption of standardization. The printing industry as a whole has adopted standards that have come through natural causes. These standards include standard equipment, standards of type faces, type height, standard sizes and weights of paper, a standard cost system, standard hourly selling rates, and, in outstanding plants, standard production schedules, standard rates of pay, standard sizes on delivered jobs, standards in number of pages on booklet work, etc. Unfortunately these standards in the main are not industrial standards which are set by authority, nor do they act as a model in the art of printing and typography, for actually the standard of

quality and the standard of typography, the chief measure of printing, are little understood and thus cannot be observed. Unfortunately, many printers have attempted to develop business along individual lines. For instance, there are thousands of type faces used, whereas authorities tell us there are only twenty good type faces for all classes of printing. Hundreds of papers with apparently different characteristics—all in relatively few classes—peculiar sizes, impractical, expensive processes—all of these advanced for the sole purpose of exploitation or personal profit, all making way for standardization.

Weighing and developing on a scale of standards offers something better.

We know, of course, that there are various standards of living, and the more we learn of standards of living the more apt we are to progress. There are various standards of quality in printing, and a like manner of observation would tell us that the more we know of standards of quality the higher our standard is likely to become. Unfortunately, many men engaged in our profession have attempted to standardize to the extent of eliminating individuality, originality, progress and improvement. Standardization of this type becomes a stumbling block, if it does not entirely stop all progress. For this reason many do not realize that every improvement in the mechanics or standards of quality should be on the basis of correct engineering.

And so we find from Europe's medieval population of five million, existing in a squalid setting with no towns, no intercourse, no anything—we have advanced to a population of hundreds of millions—a complex social structure with its existence, maintenance, and pleasure dependent upon the reproduction of words by use of paper, type and ink.

Generally speaking, from a craft for the amusement and knowledge of a few, printing has grown into a great industry in which there are many wonderful institutions operating on production schedules and under able management.

In looking into the future we are encouraged to believe that we are to have a higher order of executives, that printing will be sold to accounts rather than as jobs, that profits will be reinvested and thus capital increased, that engineering and standards will become increasingly more important; for today in this industry we find many wonderful institutions operating on production schedules and under able management, and showing not only satisfactory profits but rendering a service to civilization and helping to develop the printer of the future. Of these concerns the majority are specializing in some one or more classes of printing which they have found themselves able to do as well or better than any of their competitors and thus have been able largely to control their own destinies. There is a second class of printers who have shown themselves as pioneers in the development of new equipment and new means and methods of handling the usual run of commercial printing. Other printers have stood out for quality; still others, through the development of definite factory practices and a philosophy of high production requirements, have shown marked success in this field. But unfortunately these firms are a very small minority of the firms representing the printing industry. They must serve as our models for the future and inspire us to believe in the future of printing. In closing let us again sound a warning note—success in this industry, as in all others, depends upon Progress and Progress upon well-organized thought and work; that is, management, engineering, service and standards constantly improved.

Standardization in the Textile Industry

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THE textile industry should be well served by the aims of standardization. The purpose of standardization is to effect in a plant or industry, uniform adoption of the most economical and useful materials, machinery, equipment, processes, methods, and practices of production and distribution, and to maintain definite and suitable quality of products consistent with the economies and uses desired. The textile industry is so large as to warrant very extensive standardization. It is a prominent industry in any manufacturing country. Among manufacturing and mechanical industries in the United States, the Census of Manufactures ranks textiles in the highest place with reference to the number of persons employed. The materials, types of machinery, and products are common to all civilized countries, so one would naturally presume that standardization has been carried on very extensively in all phases of the industry; but for various reasons it has not been carried very far. This paper, however, will present some of the advances that have been made or are being made

Standardization of Materials and Products

Cotton

Trade in cotton has been helped much by standardization. The development of cotton standards has been progressing slowly over a long period of years. Fifteen hundred years before Christ, the Rig Veda hymns of India sang of the garments woven of fine cotton. The current volume of world trade in raw cotton alone amounts to about one and one-half billion dollars annually, and is so large that it demands a fairly satisfactory degree of standardization in terminology and in methods of testing cotton.

The way in which cotton standards are used by the trade is of interest. Cotton is sold by weight, and the price varies according to the grade of it. In specific price quotations figures are given which tell the average length of the fibres, or staple. The staple of cotton grown in the United States may vary from three-fourths to one and three-fourths inches long. Further description of the cotton tells its grade as to amount of dirt, of particles of seed or other extraneous matter, of gin-cut fibres, the strength, and the color. Further detailed description is given regarding each of these qualities, as, for example, the color gradations are white, tinged and stained. Price quotations in the United States are stated for cotton of a certain grade known as Middling Upland.

There are varieties of cotton just as there are varieties of apples. The characteristics of the varieties differ not only in staple length and other matters mentioned above, but also in pliability, fineness, elasticity, and harshness of the fibres. The usual characteristics of any certain variety of cotton may be altered by the soil on which the cotton grows, or the kind of weather during the growing season. It was a disappointing experience when the famous Egyptian cotton transplanted to the United States would not produce the same cotton as it does in its own native soil and climate. Universities, experimental farms, governmental agen[illegible],

agricultural organizations, dealers, and individual farmers are all striving to attain better and purer breeding of cotton seed.

In spite of complicated variations, cotton may be so well graded and classified that a buyer can find a common terminology with which to describe definitely his specifications for its purchase. English cotton manufacturers no longer send buyers to America as they did in early days, but now rely upon standard descriptions; and millions of pounds of cotton are sold each year on the basis of these standard descriptions with no inspection by the buyer until delivery.

Wool

Trade in other textile fibres or raw materials has also benefited by standardization. Wool while still in the fleeces as clipped from the sheep is dirty, oily, and has a large content of burrs, pieces of leaves or little sticks; in this condition it is called wool in the grease. How standardization has improved a process may be noted in the cleaning of wool. The burrs are removed by heating the wool to a certain point which is hot enough to char the burrs but which will not injure the wool. The charred burrs are then crushed and readily beaten and blown out of the wool. Without standardized heat control, this process would be difficult, as a lowering of the heat would not char the burrs, whereas increased heat would damage the wool. After it has been cleaned and washed, it is called scoured wool. It is classified as to whether it is fine, half-blood, three-eighths, or quarter-blood. These and other standard terms identify the characteristics of fleeces or parts of fleeces.

Silk

The sampling, testing and grading of silk is very strict because of its price, which is $5.50 per pound for the best quality of raw silk. Regular market quotations in this country for either silk or rayon are for yarn only. Rayon is a synthetic, manufactured yarn and so lends itself to uniformity. There are only about ten companies in the United States manufacturing rayon on a commercial scale, and seven of these make a product which is chemically the same, namely, viscose rayon.

Yarns

Definite practices have been established regarding the various textile yarns. The *count* of either cotton, worsted, or merino yarn refers to its size. Cotton yarn of count 1 is that size of which it will require 840 yards to weigh one pound; count 10 requires 8400 yards per pound and is one-tenth as coarse as count 1. For either worsted or merino yarn count 1 requires 560 yards per pound. The size of wool yarn is designated by *cut* or *run*. The term *denier* is used in telling the size of either silk or rayon yarn. The denier of a yarn is the weight in grams of 9000 meters, and there would be 4,464,528 yards of yarn in No. 1 denier. As the denier figure increases the size of the yarn becomes coarser, but as the count figure increases its size becomes finer. Spun yarns, such as cotton, worsted or linen, as distinguished from filament yarns such as silk and rayon, are first spun and twisted into single threads or strands. These strands may later be combined in any number to form folded or plied yarns. A term 10/2 means that the count of each strand is 10 and that the yarn is two-ply. Another standard feature in the description of yarn is a statement telling the twists per inch and the direction of the twist. There are standard tests of strength and elasticity of yarns. Regularity or evenness of the yarn is a matter of comparison, there being no norm or

scale for this quality. No precise numerical description of yarn is used with reference to freedom from irregularities as single knots, slubs, or particles of seeds; but a standard method of examination has been developing and the descriptions are becoming more and more precise.

A feature of great significance regarding yarn is the amount of moisture which it contains. Most textile yarns are hygroscopic, so it is possible to load them heavily with moisture. Under such circumstances a purchaser may pay dearly for the water in the yarn, and he might incur a risk of yarn being affected with mildew, and a risk that the yarn packages in drying out would become soft and unsuitable for the intended processes. On the other hand, the yarn may be so dry as to be weakened, and then it requires conditioning before it is ready to be used. The proper amount of moisture improves the running quality of yarn. The amount of moisture which is found to be in the yarn by test may be stated in either of two percentages: *Moisture content* is the ratio of the weight of moisture to the total weight; *moisture regain* is the ratio of the weight of moisture to the bone-dry weight of the yarn. Custom closely approaching standard trade practice is developing to regulate the amount of moisture in the various kinds of yarn.

Yarn is wound in many different forms of packages depending upon the immediate processes involved. To those not familiar with the textile industry, it may be surprising to know that about two miles of yarn are used in making one square yard of fine cotton cloth. So many hundreds of miles of yarn are processed in a textile mill every day, that winding necessarily is a very prominent part of the textile industry, for such immense quantities of yarn cannot be handled or used advantageously unless the yarn is wound in convenient packages. There are some uniformities in wound packages in spite of such a variety as skeins, rolled warps, spools, bobbins, cops, and cones. Skeined yarn is in hanks, one loop about the hank being one and one-half yards in length, and the total length of the skein is usually 840 yards. For long-chain quilling, an operation of winding simultaneously a large number of bobbins by means of a certain winding frame, warps are usually 6000 yards long and have 378 ends each. Cones for knitting purposes usually weigh about one and one-half pounds each, and are about five inches in diameter across the base and about three inches in diameter at the top. Southern yarn spinners have taken up with the U. S. Department of Commerce the question of standardization of yarn numbers, plies and put-ups for the avowed purpose of eliminating the risk of accumulating unsalable stocks. There are further standard details regarding the forms in which yarn is wound for handling, shipment or processing, but these few items are sufficient to indicate the trend.

Strange as it may seem, standardization is likely to begin with the product and work its way back through the processes and machinery to the raw material. Cotton yarn is the product of the spinning branch of the textile industry, and attempts to get a perfectly even, regular yarn have carried investigation and uniform improvements throughout the manufacture of yarn and to the raw material of which it is composed. But yarn is, on the other hand, the raw material of cloth making.

Efforts to standardize fabrics have resulted in studies and developments all through the manufacture of fabrics. Factors concerned with selling have ever been seeking newer and better fabrics in order to increase sales.

This has set up a trend or force opposing standardization, for it has increased the variety of fabrics, patterns, kinds of yarns, and weights of cloth. Notwithstanding the possible combinations that can be made of a large number of sizes of yarn, combinations of materials, of special processing and of distinct kinds of weaving and knitting, there are many fabrics with constructions and natures so well defined, that they are known in the trade by particular names, *e.g.*, poplin, serge, ratine, gingham, denim, sheeting, cheesecloth, voile, crêpe, and broadcloth.

TEXTILE MACHINERY

The standardization of textile machinery has been advancing steadily. Much like the standardization of automobiles, uniformity is noted in machines of a given make, and the uniformity is in the main body of the machine with quite some latitude of variation in accessories and extra parts. A winding frame, on which to wind bobbins, made by a certain company is likely to be of one or two general descriptions, but variations will be found in the tension devices, in the character of the guides over which the yarn is to run, and in the distance which separates the spool from the bobbin.

A similar illustration may be found in cone winders. A manufacturer is not likely to make more than two regular models, but there may be quite a number of minor attachments from which the customer may choose, the attachments being for the purpose of catching slubs, for tensioning yarn, for guiding the distribution of the yarn over the package, and for changing the shape of the package being wound. The models do not change as frequently as every year, but perhaps every three to five years, depending upon the changing nature of the winding requirements and upon the character and extent of improvements that have been developed by the machinery manufacturers.

A reason for the trend toward standardization, and the great similarity of all winding machinery for any given purpose, is the nature of the manufacturing in which wound packages are used. Weaving and knitting are the key processes in the making of fabrics. The sheer fabrics which are made on either looms or knitting machines in these days will show defects very clearly. It is easier to avoid making defects in a fabric if the yarn used is of a constant size, if it has regularity of strength and elasticity, and also if it is wound in a uniform kind of package with all packages of the same tension. If one package is soft because of low tension in winding, the package will unwind so freely that burls will be caused in weaving, or some similar difficulty may occur in knitting. If the tension is too great, the yarn may break in the operation, or become stretched. Winding machinery manufacturers advertise that their machines make "uniform" packages of "even density."

Demands for standardization, it has been noted, extend back from the key processes to the making of the yarn, and therefore affects the machinery for carding, combing, spinning, warping, and, in fact, all the machinery used in making yarn. The demands extend in the other direction to the machinery for dyeing, printing, and finishing. Mercerizing machinery may serve as an illustration of this group. Caustic soda is the chemical agent which brings about the mercerization, and machinery must be adapted to control the strength and heat of the caustic baths through which the cloth or yarn is to pass. If the tension is not great enough upon the material being mercerized, there will be a great shrinkage in length and a failure to produce a high lustre. If the tension is too great, the

material may be weakened. It is, of course, necessary to remove completely all caustic from the material, and to leave the material in proper condition. Maintenance of careful mechanical controls have assisted much in attaining these results.

PROCESSES AND OPERATIONS

One of the highly skilled processes is that of short-chain beaming. Short-chain beaming is the transferring, in one operation, of a large number of strands of yarn, in various colors, from untwisted, multiple-strand rope or chain form to a loom-beam on which the strands or threads lie widespread, side by side. Men in this craft think that it requires three years for an operator to learn to beam, and then he is not considered a good beamer until he has worked at the craft a number of years longer. In such a highly skilled job, one might think that the art involved would be so great that it could not be reduced or simplified to one of standard practice. However, the job, highly skilled as it is, lends itself to standardization in certain very important respects.

The standardization of short-chain beaming begins, of course, with the materials to be beamed and with the equipment. The size of the beams on which the yarn is wound is selected for the kinds of yarn beamed, the number of ends per inch (in width of the cloth), the width of the fabric to be woven, and the length of the warp to be beamed. The tension drums are made uniform for all work of a given type, and the speed of the machine is regulated by the foreman so as to conform to specified practice. The kind of reed or beamer's wraithe is also specified for the type of work. Such details were formerly left more or less to the opinion of the beamer, and the result was a different kind of beaming job from each beamer. Even the same beamer would turn out different qualities of work, depending upon what kind of beams or other pieces of equipment happened to be handy when he started the job. A further refinement is the specification in standard instructions regarding the way in which the yarn is to be arranged by the beamer in order to form the proper patterns.

PERSONNEL

Better placement of employees is a usual result of standardization of machinery, materials, products, processes and operations. It is found that short persons cannot reach over the large looms, nor can they reach over the reeds of a large, long-chain quiller frame. A tall person is less adapted to the job of trucking textile material from one department to another, as he must stoop farther to reach the load, and it is therefore somewhat more difficult for him to lift loads to and from the truck. As a result of other manufacturing standardization, employment managers are able to make better assignments to jobs, as it is possible for them to determine better the requirements for each type of work. If improved selection and better placement of employees in this sense is standardization of personnel, then it is a concomitant of other steps in standardization.

As a part of the improved use of personnel, careful studies are made of jobs. Job descriptions and standard procedures are already in effect in quite a number of plants. Cheney Bros., silk manufacturers of South Manchester, Conn., have made very commendable headway in the study of jobs, training methods and learning periods. Similar studies of jobs have been made in the garment factory of the Dutchess Manufacturing Company of Poughkeepsie, N. Y. The

Director of Vocational Education of Parker School District in South Carolina has been in touch with textile companies in that vicinity who are developing standard job practices in weaving and loom-fixing. It would seem that only routine work could be standardized, and yet the work of loom-fixing is being standardized,—a job which has to do largely with repair or adjustment which is mainly exceptional. The Aberfoyle Manufacturing Company of Chester, Pa., has not only been developing standard job specifications for operators but has started the standardization of procedure for foremen.

EXAMPLE OF GENERAL CHANGE

An illustration of how standardization is brought about in materials, machinery, processing and operating, all in one general change may be seen in the developments made in sizing. This operation is putting a starchy mixture on yarn so that the yarn can be more easily handled in subsequent operations. The starch lays the hairy fibres of the yarn so that they do not make so much lint and consequently become tangled and break; it also strengthens the yarn and forms a coating which takes the wear of the operations saving the yarn itself from the chafing which would otherwise result. Once upon a time the sizing department would start out in the morning with a fresh batch of size mixture, made up of a certain number of buckets full of starch and tallow,—and any bucket was a bucket. The boss guessed at how hot the mixture was, and if there was a large amount of work ahead, the mixture was made a little stronger than usual. First white yarn was run through the sizing machine, and it was sized heavily. Later the light colored yarns were run through and finally the dark colored ones, thus avoiding the shading of yarn by any color deposits that might have been squeezed out into the size mixture. The darker colored yarns probably required the heavier sizing, but by the time they reached the sizing machine, the mixture was thinned out, although the boss did his best to replenish or strengthen it occasionally during the day as he found opportunity.

What improvements are made by standardization in sizing? The squeeze rolls are dressed regularly so that uniform squeeze effect is made on the yarn. The ingredients of the mixture are weighed or measured with precision. Each batch is cooked a definite length of time in properly constructed tanks; a chart on the side of the sizing tank or box indicates and records the temperature of the mixture in the sizing machine. An instrument is being perfected to register the viscosity of the size mixture, so that it may be maintained at certain points for all batches of yarn sized during the day. With materials, machinery, equipment, and processing all carefully standardized for each type of yarn, it is a logical and simple step to standardize the operation completely by standard procedure for every man on the sizing job.

The illustration brings to light a characteristic of the standardization movement. In one plant sizing may be standardized in one way, whereas in another plant the same type of sizing may be standardized with machinery, materials and details of methods quite different from those used in the other plant. Thus standardization may be extensive in individual plants and not result in uniformity in the industry as a whole.

DEVELOPMENTS BY ORGANIZATIONS

There are numerous societies and organizations that are encouraging and

assisting standardization in the textile industry. The Division of Simplified Practice of the U. S. Department of Foreign and Domestic Commerce has kept the idea of standardization in the foreground, and it has been instrumental in effecting simplification of certain products. Assistance in studies, experiments, and research on textile problems has been given by the Bureau of Standards which belongs to the same department of the National Government. The American Cotton Growers' Association advocates cotton covering for baled cotton, and standard tare weights for the bale coverings. An organization called the Better Fabrics League functions primarily for the benefit of dyers and cleaners. The Converters' Association is active in discouraging misbranding. The Home Economics Bureau of the U. S. Department of Agriculture is interested in all phases of standardization. The American Society for Testing Materials has a Committee D13 which is assigned to the field of textiles. Elsewhere in this issue there is an article regarding the work of the A. S. T. M., as it is called, but it may be suggestive to mention here a few titles from their 1927 list of standards:

"Identification of Textile Fibers and their Quantitative Determination in Mixed Goods."
"Standard Specifications for Tolerances and Test Methods for Cord Tire Fabrics."
"Standard Specifications for Tolerances and Test Methods for Cotton Yarns, Single and Plied."
"Standard Methods of Testing Woven Textile Fabrics."
"Specifications for Textile Testing Machines."
"Tentative Specifications for Tolerances and Test Methods for Rayon."
"Tentative Specifications for Tolerances and Test Methods for Knit Goods."
"Tentative Methods of Testing Grease Wool and Allied Fibers for Scoured Content."

The *institute* idea has found a receptive attitude in all of the large fields of textiles. The Cotton Textile Institute, directed by Mr. Walker D. Hines, is attempting a comprehensive program which is certain to bring about standard practice in some unsatisfactory trade conditions, and its work will no doubt affect manufacturing. There is a Wool Institute, a Rayon Fabrics Institute, and a Carpet Institute, each of which has a program for its respective field somewhat similar to that which the Cotton Textile Institute has planned in its field. The Associated Knit Underwear Manufacturers of America propose organizing a Knit Underwear Institute which may be a subsidiary to the present organization or supersede it. The Standardization Committee of this latter group of manufacturers presented measurements for five different kinds of garments to the annual convention held in February, four of which were adopted.

There are, of course, quite a number of manufacturers' associations, and from each of them come some practical leads towards standardization. The National Associations of Cotton Manufacturers, when incorporated in 1894 as the "New England Cotton Manufacturers' Association," had its purpose stated in the charter

> for the purpose of encouraging scientific investigation and experiment as to the methods of manufacturing cotton; collecting and imparting information relating to this industry; promoting social intercourse among its members; and establishing and maintaining a library of works on textiles. . . .

Although the name of the organization has changed, the statement of its purpose has not changed; and although it

was organized before the word *standardization* was much used, it has always been disseminating information so that all of its members could bring their manufacturing up to the best practices found. The American Cotton Manufacturers is a similar organization that has drawn its membership from the South, and it sometimes meets with the N. A. C. M.

Such developments are not without their parallels in other countries. Consul General A. T. Haberle of Dresden reports to the Department of Commerce that

> According to recent newspaper reports the principal German manufacturers of rayon contemplate making an agreement regarding the standardization of manufacturing methods and the make-up and packing of this product for the purpose of reducing the cost of manufacturing. A commission has been formed to discuss the problem.

A communication from Consul Hamilton C. Claiborn of Frankfort on the Main, carries the word that

> very intensive work is being carried on in the German laboratories toward improving the quality of the product (rayon), particularly the fine acetate yarn, and producing a thread whose *affinity* for the different dyes may be depended upon as uniform.

One other type of organization may be mentioned as tending to further standardization, namely, integration of industry.

Of the many large textile companies or combinations, one example may be very suggestive. The corporation which is cited,[1] manufactures and sells

> coarse cotton cloths of four classes from the point of view of the consumer. . . . The plants of the corporation consist of . . . two finishing plants (in New England) and five (Southern) cotton mills which spin and weave coarse cloth from raw cotton. . . . The new owner was somewhat attracted by the experiment of introducing scientific management. . . . The principles of scientific management to which reference is made are (1) research, (2) establishment of standards, and (3) control of operations, and are applied all along the line—in determination of policies as well as in merchandising, finance, and production. . . .

One detailed statement from the paper from which these excerpts are taken is typical of the bearing of this combination in the direction of standardization:

> The standardization of these mills with respect to loom construction, conditions of equipment, quality of raw materials, and otherwise, makes possible a functionalization of labor with respect to skill requirements of the different operations. Workers are assigned to operations in accordance with the kinds and degrees of their skill and the kinds and degrees of skill required by the operations; and labor of any particular kind and degree of skill is not utilized on tasks requiring lesser grade.

SUMMARY

In summary, attention is called to these three points:

1. There is a quickened movement toward standardization in the textile industry.

2. The nature and extent of the industry, its materials and processes, call for standardization.

3. Organizations which stimulate investigation and share information, are doing much to hasten and expand the movement. Chief among these are technical societies, governmental agencies, trade associations, the institutes, and industrial integrations.

[1] "Scientific Management in a Textile Business," by Henry P. Kendall, Treasurer of Kendall Mills, Inc., in Bulletin of the Taylor Society, December, 1927.

Standardization in the Music Industries

By Henry C. Lomb, M.A.S.M.E.
Chairman, Standardization Committee, National Association of Musical Instrument and Accessories Manufacturers

VIEWED cursorily, no two enterprises could possibly be more antipodal in their nature than standardization and the music industry. The first reaction of nearly every one connected with the music industry, or with any other art-industry for that matter, to a proposal to apply the principles of standardization to such an industry will be unfavorable; it will be said that standardization and the art-industries are as far apart as the poles and should always remain so. Presumably the music industry feels itself so permeated with the art-spirit that the mere mention of standardization (or of its ally, simplification) is apt to provoke risibility if not disdain. Because the products of the music industry, viz., musical instruments, are the vehicle for one of the highest forms of art-expression, viz., music, it supposedly follows that any influence which savors of mechanistic materialism should at once be anathema. For is not Art, in its very essence, the free expression of an unfettered soul, undefiled by the rules and proscriptions of that pedantic and hamstrung exactitude which Standardization postulates? Of what avail, then, to inquire into a method whose every precept is based on principles that are alien to the fundamental concepts of all art-activities and whose adoption could only bind the industry in chains?

Were this indictment only half true, it would be idle to discuss it. It is, of course, wholly true that the art or the artistry of any nation, particularly that of a free nation, can never reach its highest development if blind restrictions are laid upon it, because freedom of action in art is as prime an essential to its progress as is freedom of speech to the development of a people. In either case, to curtail liberty is to court disaster. But before passing judgment, let us examine briefly the defenses of standardization, seek its real purpose and review some of its accomplishments for the common good.

Defenses of Standardization

The basic idea on which standardization rests is the elimination of economic waste. Few will dispute that the purposeless wastage of materials, be they natural resources or articles fashioned by the hand of man, is in itself unpardonable. When, however, the efforts of a human being are deliberately and willfully thrown away, the wastage becomes reprehensible. The most precious thing in the world is life itself, and to permit or even to tolerate a useless human activity during the brief span of life that is alloted us, is well-nigh a crime against humanity. Whatever philosophic interpretation we may choose to put upon the usefulness or the uselessness of any given activity, there can be no gainsaying the fact that no one would actually benefit, for instance, from the exertions of a group of workers engaged year in and year out in producing one hundred varieties of ten-penny nails when ten varieties would amply suffice for all reasonable demands, and when, moreover, other employment at least as gainful for the workers could readily be found. What constructive purpose was served when, as is authentically reported, a single firm made

7500 different varieties of bed casters, or when three ax manufacturers were making axes in 34 types, 4 grades, 35 brands, 11 finishes, 19 sizes, a total of 6118 variations? The potential savings to ax-using communities through the elimination of unnecessary varieties of axes are so transparently self-evident that the question carries its own answer.

PURPOSE OF STANDARDIZATION

The elimination of superfluous varieties and of harmful or useless qualities of the products of an industry is ordinarily the first step in standardizing and follows in regular course from the systematic survey of the whole field of that industry, which is a necessary preliminary in every case. In such a survey, the interests of the ultimate user or consumer, no less than that of the maker and the seller must, however, be conscientiously consulted; for the astutest business practice of today acknowledges that the old adage of *caveat emptor* (let the buyer beware) has fallen into disrepute. It is commencing to be recognized that the final criterion for the successful merchandising of a given product is its fitness for the use to which the ultimate consumer puts it, in short, its real utility. Such fitness cannot, moreover, be determined on the basis of mere arbitrary opinion, even of expert opinion; it must be grounded on facts gleaned from every available source and subjected to a searching analysis with due regard also to related industries.

In these exhaustive experimental researches and in the coördination of the assembled facts with the needs and conditions of the moment, the scientist and the engineer will be the indispensable guiding spirits. Accustomed as they are to impersonal and purely objective methods of investigation, they will not be led astray by fantastic claims, but will base their findings on verifiable facts alone. Always will they seek to retain and hold fast to that which is good, but not content with what they find on view, they will strive to simplify, to improve the product and to search out new roads through regions hitherto staked off as forbidden territory. And they will not rest, even though the problem is satisfactorily solved for the time being, but will ever be on the alert to re-simplify and to re-improve, exemplifying thus the best traditions of science and of engineering, that their protégé, standardization, is not a fixed, immutable thing, but must itself pass through the same stages of development as do the objects upon which it operates.

Briefly summarized, then, the standardizing process involves first, the reduction of types, sizes and varieties of a commercial article to a minimum; secondly, the adaptation, out of this minimum, of these variations to the greatest possible serviceability and, finally, the establishing of specifications which precisely define the properties or performance of the article, so that it may be measurably reproduced at will and subjected to definite tests upon completion. Refraining from further detail, we will only state that the accomplishments of standardization as instanced in a single industry, the automobile industry, are typified by a saving of millions annually.

ERADICATION OF VARIETY

There are two points in this program of the standardizationalist that the art-industrialist will at once seize upon. The first is the eradication of variety, and the second, the criterion of utility. He will say that individuality, the great summum bonum of art, would be completely extirpated at once by suppressing variety, and that the aspect of civilization would be reduced to a single

level of drab mediocrity. And as to the utility of an object, it is a cardinal principle of art that it must concern itself only with the pleasure and exaltation which its creations bring, than which there can be none more deep or lasting. In the contemplation of a great painting by an old master, or an overpowering symphony of an immortal composer, generations have found a solace and a delight that is as independent of personal profit as well can be. Standardization implies, says the individualist, that machine-made copies produced by the million can equal the original, when even the copy of a Rembrandt made by the master himself might conceivably fall short of the original. Individuality inheres to a single product of genius and to that alone.

INDIVIDUALITY

These points are well taken, but they are somewhat beside the mark. Individuality is indeed as indispensable in art as is individualism in our body politic, Marxian theory to the contrary notwithstanding. Along with liberty, we of America cherish individualism, that is the upholding of the rights of the individual, as our sweetest heritage. We must not, however, confound the purpose of art, or to be more precise, of the fine arts, with the purpose of the industrial arts. The products of the art-industries are primarily intended to serve some definite use and the element of beauty is superimposed upon an article of commerce in order to add to the sense of pleasure which it kindles. So common a piece as a chair should be designed firstly for comfort, strength and durability, and may then be embellished by the craftsman to his heart's content, within the confines of good taste. In so doing, he need not burden his brain, however, with the selection of the standardized nails or glue that may have been used in its make-up, so long as they help to efficiently support the structure carrying his handiwork. Other things being equal, the piano-maker need have no concern as to the color of the felt of his hammers, the comparatively slight variations in different types of bridge-pins or in the size of the case. He will exhibit his skill in the tonal qualities of the instrument, in the artistry of the case and the general beauty of the design. These factors will really be enhanced through their attention-compelling presence upon a uniform "standardized" background.

Again, consider the archetype of individuality, the human form divine. What could be more thoroughly standardized than our own bodies? In our framework, our muscles, our internal organs, and in the functioning of all of these, we are the acme of standardization. In a physical sense, we are all cast, as it were, in the same mould. Otherwise the science of surgery, and to a lesser degree, perhaps, the practice of medicine also, could never have arisen, and every enforced excursion to the operating table or to a sick bed might well be a call to the valley of the shadow of death. Our individualities have not suffered from this standardization. A man's double is so rare as to cause comment; a mother can always differentiate between her baby-twins; the adroitest criminal, subjected to the proper tests, cannot long hide his real identity. Personality is expressed by the lilting step, the open countenance, the warm handclasp, the flashing eye, the sonorous voice and not at all by the slightly varying relative positions of two hearts even though they beat as one. As pointed out by Whitney,[1] standardization, far from cramping in-

[1] Whitney, A. W., "The Place of Standardization in Modern Life." Inter-American High Commission, Washington, 1924.

lividual initiative, is really "the libera- or that relegates solved problems to he field of routine" and gives genius ree rein for the creative work it alone an do.

ACCOMPLISHMENTS OF STANDARDIZATION

As intimated above, the final ques- ion whether standardization, wisely dministered, will redound to the bene- it of applied art and to the music and ther industries dependent thereon, can erhaps best be found by inquiring into he public ends that these industries eek to serve. Are these ends not sat- sfied when the greatest possible im- etus has been given to art-appreciа- ion, a result dependent upon and ttended with the widest possible dis- ribution of art-products? Truly has t been said "that music was intended y Divine Providence for all the people nd is of benefit to everyone." [2] With imilar force, this applies to the other ine arts also. Man does not live by read alone. And while the problem of laily sustenance and shelter will doubt- ess be uppermost in the minds of mil- ions for years to come, the rising stand- rds of living will bring opportunities or culture to increasingly larger num- ers of our people.

If standardization can help to make vailable to these potential music-lov- rs and art-lovers the pleasures and the enefits to be derived from the cultiva- ion of music and art, then the indus- ries in question owe it to themselves nd to their public to embrace its eachings and profit by its lessons, as so many other industries have already done. In this manner they will aid in the ultimate purpose of civilization of deflecting the thoughts of the masses from the mean, the sordid and the vile to the good, the true and the beautiful, and will so add to the sum total of human happiness.

The music industry has already registered its approval of the fundamental principles of standardization by the adoption of the standard pitch for musical instruments and with proper direction will no doubt extend the application of these principles. Let the industry never forget that through its instruments, it disposes over one of the great constructive forces of the world, music. It is needless to dwell here at length upon the importance and value of music in moulding the lives and the conduct of men, for we are all touched by it. Although playing primarily upon the emotions, music nevertheless exercises through them a powerful influence upon the mind and upon the sway of the imagination, the mainspring of all original creative effort. In thus disseminating music, therefore, the music industry will render a great service to education and human welfare.

A distinguished telephone engineer has recently said that he envisages the time when a vast network of intercommunication between all nations will make necessary the use of a common language that will bind the peoples of the earth together into a single brotherhood. Is it too much to say that, in a sense, this common language already exists in music? A universal language based on musical sounds is not impossible, for the appeal of music is universal and it is understood by every human creature. What wonders could not be wrought if the activities of mankind were attuned in unison to the divine harmonies of music? The internecine quarrels, the misunderstandings, the hatreds that have scourged mankind through the ages would be forever banished and the peace and contentment, not of false Utopias, but of a practical and workable idealism, would take their place. In contributing to

[2] C. M. Tremaine, "Enriching Human Life through Music." New York, 1926.

this great cause by fostering music in the way it readily can, the music industry would make its own unique contribution to the progress of the world. With such a mission before its eyes, how can it, how dare it fail?

Standardization holds out its hand in service, not for mastery.

Standardization in the Filing Equipment Industry

By JOHN L. STEPHENS
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FROM the East Indian, Gandhi, comes the warning that the smashing of machines and the return to a medieval spinning wheel mode of life is the only salvation open to mankind. A fanciful play, R. U. R., a few years ago was commented upon widely by many individuals who are interested in our economic and social progress. Dr. Glenn Frank of the University of Wisconsin recently wrote a series of three articles on our so-called machine civilization and these were published in a widely circulated business magazine. A German motion picture, "Metropolis," has attracted considerable popular interest. Dr. Samuel Stratton of the Massachusetts Institute of Technology went so far as to entitle an article "Robots," which appeared last fall in a large national weekly,—this title coming directly from the imaginative play mentioned before, and referring to the man-made, man-like automatons which performed the physical tasks of men.

To a degree there is a popular interest in this age of the machine. More than that, economists and the more important business men are interested in it. What the future holds is ever the subject of speculation, and the future is concerned more with this order called the "machine age" than with any other condition. It is not too much to say that war and peace, political reformations, laws, art, social customs and even some aspects of organized religion are all merely functions of this tremendous affair,—not the all-important considerations that some or all of these have been at one time or another in the past.

It is generally accepted, then, that the machine is the most significant outgrowth of modern civilization—or—modern civilization is the outgrowth of the astounding changes the machine has made. Take your choice.

Now, it is true that records and writings and figures are what might be called the nervous system of the machine-organization, the present-day large scale production and distribution organization. The utility of a machine is greatly reduced or destroyed entirely if its owner does not know whether it should be working or not, or how often it should work. The only way an owner can decide is by the information that comes to him in the form of records. Records of sales, written suggestions of distributors, records of wages, records of transportation agencies, records of credit, reports from the suppliers of raw materials,—all these decide the reason-for-being of the machine. Conversely, perhaps the machine was the original reason-for-being for the chain of information, but it subsists, or produces, only in proportion as the written records indicate it should produce.

Henry P. Dutton of the Northwestern University School of Commerce discusses this in this manner:

> In a certain great manufacturing company there are twenty or more large factories and the selling agencies encircle the globe. In matters of detail the producing units are autonomous but the central executive organization, through its staff services, works out the policies and standards used by the local unit. The plan of organization is typical. . . . The advantages of the large unit in business were clearly recog-

nized in the nineties and many attempts were made to secure these advantages by consolidation. The results were frequently disappointing. Various reasons explain the earlier failures, but unquestionably one explanation lies in the fact that the tools and systems of record and communication then in use were inadequate to the needs and demands of the large business unit. . . . In a small company the proprietor himself handles many of its affairs and has a first-hand contact with the rest. Such intimate contact becomes impossible as details multiply. Its place must be taken by an organized information system that will supply information that is not only timely; but abundant and accurate as well.

Mr. Dutton then shows how business record systems and business machines have helped make the large complex business unit practical. He says:

> More thought is being given to the design of the system as a whole, to the end that when a fact is recorded or a transaction initiated, all subsequent uses of the fact or sequels of the transaction may be foreseen and provided for. . . . The connection between the application of machine methods to office and record work and the increase of the possible effective size of the organization unit, is apparent.

STANDARDS IN RECORD-KEEPING EQUIPMENT

Therefore, it is obvious why it is possible for the filing equipment industry to take itself seriously. Machines make modern business, ideas make machines, and ideas feed on information, which *because of its multiplicity and variety must be kept in order, available, accessible, useful.*

It is with the standardization of record-keeping equipment that this article is concerned.

The first thing to do is to find out briefly how filing equipment developed up until the time that the first move was made toward standardization. This does not require a detailed historical account, and it suffices to say that the systematic filing of letters, bills, cards and other records did not amount to much in any line excepting library practice until the beginning of this century. Before this nearly every place of business or establishment where records were filed used a system peculiar to its own demands. The sizes of records varied widely. One of the first card filing systems employed playing cards. This was devised by an abbé who cataloged the Bibliotheque Nationale in Paris in the latter part of the eighteenth century. About the only established sizes were for lawyers' use, the legal or foolscap size, and the document size, both of which are used today. The natural result of this diversity of record sizes was that every business house that considered itself large enough to have a filing system ordered specially made equipment from the manufacturers. These manufacturers, however, speedily realized that demand alone does not determine what is bought, and began to sell indexing specialties of various kinds. It was around 1900 when manufacturers, who had been filling special orders, brought out small units which stacked horizontally for more or less recognized records. These were the first stock filing units, and they did not meet with much public acceptance.

Individual selling points, construction features and peculiar advantages were emphasized by the different manufacturers and there was practically no attempt at standardization, except the natural conformation to the record sizes demanded by the customer.

The work of Melville Dewey and H. E. Davidson during the last fifteen or twenty years of the past century must not be forgotten, however. These men were responsible more than anyone else for the first application of card systems to business. At first Dewey had

paid particular attention to the indexing of libraries and scientific institutions, and many installations of this nature were made. Much of this work was done in and around Boston. Dewey was a strong advocate of the metric system in card record measurements and did much toward standardizing on that basis, but today, in spite of strong Government endorsement, the only metric cards in use are nearly always found in libraries or scientific institutions. Standard sizes now are in inches: 3 x 5, 4 x 6, 5 x 8, 8 x 5, and so forth.

But to get back to cases, the general acceptance of present filing methods came after the beginning of this century, and a National Association of Steel Furniture Manufacturers was formed March 27, 1915. This is now composed of thirteen members. Four other manufacturers cooperate with the Association. Headquarters are at Cleveland, where the secretary, J. D. M. Phillips, is located.

There are more than fifty manufacturers who make filing equipment. Considerably less than half of these belong to the Association. Of the members of the Association, about five can be classed as major manufacturers.

Before going any further it is advisable now to show just how the *products of these companies vary*. The following table should be noted carefully, because it is a picture of the *present condition* in the filing equipment field. It shows the variety of measurements in a case designed to accommodate letter size papers,—a letter file with four drawers, one on top of the other, all in one upright case. This is the bread-and-butter item in every manufacturer's line, and the table shows the differences in the cases of the five major manufacturers.

WHY STANDARDIZATION

One manufacturer, accepting membership in the newly formed association, wrote: "The standardization of metal gauges, finish, size of drawers and particularly the uniformity and clarity of architects' specifications are some of the problems for your early attention."

Now, there are two chief designs in all steel filing equipment:

1. Verticals or Uprights (such as that described in the table above).
2. Horizontals (which have the same construction principles, but have the drawers *side* by *side* in the unit, instead of one above the other. These horizontal units have intermembering devices which enable the user to stack them up in any combination that suits his purpose. Two widths are usually found in each manufacturers' line. The narrow width accommodates one letter size drawer; the wide width accommodates two. Other size records can

Company	Height of Case	Width of Case	Depth of Case	Filing Capacity in Inches Per Drawer	Filing Capacity in Inches Per Case	Cost Per Filing Inch
A.....	52	14¼	27	25	100	.567*
B.....	51	14 9/16	25¼	23⅝	94½	.603*
C.....	52⅝	13.94	25	22¾	91	.651*
D.....	51 13/16	14.19	24½	22 5/32	88.652	.651*
E.....	50¾	15 1/16	25 1/16	23 3/16	92¾	.636*

*Correct in September, 1927, according to all available information.

also be filed in drawers made for the purpose and built into the unit, but the two widths remain the same, of course. The horizontals of one manufacturer will not in any case interlock with those of another).

Wood filing equipment is practically out of date and is almost entirely supplanted by steel, for obvious reasons. Exactly the same conditions existed in wood as in steel, which came into prominence from ten to fifteen years ago. Wood is not considered in this article.

At any rate, one of the *very first moves made* by the Association was an investigation of standardization.

Before going further, let us note that there are *two* distinct considerations in the standardization of filing equipment. These two considerations are entirely different, and radically different in their effects on the industry.

1. Standardization of finish, gauges of metal, grades of metal,—in other words, minimum specifications as to the properties of the materials that make a filing cabinet.
2. Standardization of all lines as to exterior dimensions and intermembering devices.

Now we will see what the Association first did toward standardization. In the words of the secretary, soon after the Association was formed there was a discussion and submission of samples of mahogany, oak grain and green finishes, with the idea of harmonizing them. Eventually, standards were agreed upon, but when each member analyzed the effect of adding to existing installations and of removing individuality in competition, no action was taken.

As competition increased, the variety in styles became more apparent, so the Association appointed a committee to see what could be done about eliminating superfluous styles. That committee is functioning today and has caused the removal of many items from the lines of the various manufacturers. These removals were made because the items in question did not fill any consumer demand worth considering.

But this progress has been necessarily slow. The public establishes the sizes of the records that must be housed and they claim, in turn, that the paper dimensions are determined by the quantity of space required on each piece of paper to show properly what is written or printed there. There has been no consumers' agreement. At present, there are twenty-four record sizes in common use, some of which vary as little as three square inches.

The failure of the members to do anything about standardizing on finishes is easily justified. It must be remembered that a great deal of each manufacturer's business is "repeat." A large customer standardizes on a certain line. He adds to it from time to time. The first case he bought is exactly the same as the last case he bought. His filing facilities consequently are a unit in every sense of the word. A good filing cabinet will last the life of nearly any business. Tests have been made proving that a really good cabinet will operate for a hundred years without wearing out. Filing cabinets are not scrapped like most other machines. They last for years and years. Why should a customer be forced to accept cabinets of different finish from the ones of the same make that he already has? There would be no justification of that.

This would be almost as impossible as it would be to change over the entire line of record card sizes to the metric measurements. This would probably result in the scrapping of half or more of the manufacturing equipment in use today.

The next movement toward stand-

ardization was really not a movement at all, because it affected only one consumer. It happens that this consumer is the largest in the world. The General Supply Committee of the United States Government has purchased as many as nine thousand pieces of equipment in one year. But the fact remains that this committee does not represent the buying public,—only one large customer.

The Government laid down certain specifications as to intermembering devices and outside dimensions. One manufacturer accepted the Government standards, but other manufacturers have also furnished filing equipment to the Government, and conformed to the standards.

This development is due only a passing notice, because it meant simply a buying on specification by a very large user. It did not make a particle of difference to the buying public.

Now comes the essence of what has actually been done in the way of standardization.

On October 24, 1923, a Sub-Committee on Office Furniture, appointed by the Federal Specifications Board, wrote to the National Association asking for standard specifications. On July 29, 1926, the text of the specifications, as drawn up by the Association, was presented to the Sub-Committee. It had been approved by all except one member.

One of the engineers, who was intimately connected with the project during the time it was in preparation, estimated roughly that more than $50,000 was expended in one way or another by all the representatives who helped draft the finished text. The bulk of this, naturally, represents the valuable time of various company engineers and officials.

These specifications did not limit outside dimensions or interlocking devices. There was no attempt to lay down a rule that all manufacturers should make all their stock units in one size, nor was there any mention of a rule requiring each member to make his goods so they would interlock with those of every other member.

These specifications did, however, set minimum limits below which the materials must not go. Following is a typical extract from the section on "steel horizontal business furniture" dated May 12, 1925. This is part of the submission of July 29, 1926.

I. TYPES AND GRADES

Steel horizontals shall be herein divided into two types, two grades and two classes.

1. Types
   Full horizontals shall comprise Type I, while half horizontals shall constitute Type II.
2. Grades
   All pieces which do not come under the following clauses shall compose the second grade.
3. Classes
   Full and half horizontals shall be deep or shallow, Classes I and II, respectively.

II. MATERIAL AND WORKMANSHIP

1. Material
   Case: Metal furniture grade 1 sheets shall be employed as follows:
   - Finished panel, 20 gauge
   - Finished back, 22 gauge
   - Dividers, 22 gauge
   - Top plate, 22 gauge
   - Base, 20 gauge

   Locker sheets shall be used as follows:
   - Inside panel, 22 gauge

   Black sheets shall be employed as follows:
   - Base of piece, 22 gauge
   - Top plate of piece, 22 gauge
   - Channels, 16 gauge

   Linoleum or other vegetable composition which has been subjected to heat, of recognized commercial quality, shall be used to cover working surfaces. It shall not be less than 0.119 inches high.

This is a sample of the detailed work that went into this exhaustive list of specifications. Note that there is no mention of standardized interlocking devices nor of dimensions that would allow the indiscriminate use of any and

every make in one filing installation. As it stands now a customer, theoretically, continues to use the make he bought when he first established his filing system. He does this to keep his filing equipment coördinated and standardized, within itself, 100 per cent.

The attitude taken toward dimensions in the Association's book of specifications can be found on page 10, Section VII, of the portion devoted to "steel clerical business furniture" (chairs, desks and tables). Here it is: "*Furniture does not intermember, therefore, definite dimensions may be stated.*"

Minimum specifications as to materials, yes; but standard dimensions and universal interlocking devices, absolutely no.

The text has never been adopted by the Sub-Committee, and here the matter rests at this writing, so far as the general knowledge of the Association is concerned.

Surely the situation is not ideal. But what would be an ideal situation? Who is qualified, let us ask, to lay down standards for anything manufactured and used by the public? Where is standardization useful and where is it to be avoided? What right has a maker to make a product his own way? What is it all about, anyway?

It is proposed to show:

1. *What the shortcomings and virtues are of the Standard Steel Furniture Specifications, composed by the National Association, and the reasons for them.*

2. *What the logical result of absolute standardization would be.*

3. *That there is another basis on which specifications can be drawn that is far superior to (1) minimum specifications for materials or (2) the ridiculous idea of making all pieces of equipment exactly alike in dimension, interlocking devices and finish.*

4. *That a very similar field is intensively using this third method of "standardization," if it can be called that, and that it is the only universally satisfactory method, and that it has thoroughly proved itself.*

To begin with, the Specifications written by the Association are the product of the people that make the equipment. However sincere the motives of the Association, it is absurd to think that the various representatives of the member companies would be disloyal to their companies to the extent of recommending a standard for a certain piece of steel that would throw their product below par. Like many specialty fields, the filing equipment business is highly competitive. Long hours of thought have been given to the study of construction problems —better ways to do things—by the various company engineers and their staffs. Why should they contradict themselves? The engineer says, "I am making my case in a certain way. I am not figuring on losing any money for my company by throwing out machinery, buying more or changing my source of supply for raw material, or by buying another grade of raw material. I won't advise changes until I see fit. Therefore, I won't stand for anything that won't let my cabinet into the approved classification." And he's perfectly right.

Therefore, the theoretical cabinet that would be made in accordance with the minimum specifications as to materials would surely not be the best cabinet that each manufacturer could make. It would be a satisfactory cabinet, all right, but would it be a really fine cabinet? However, no such cabinet is made and it is out of the discussion. The point is: the specifications were drawn by interested parties—with the very capable supervision

of the absolutely disinterested officials of the Association, of course—but the fact remains that the Specifications were approved almost unanimously by the Association.

The virtues of the Specifications are genuine and worthy of high admiration. At the very least they represent a ready willingness on the part of an important trade association to try to the utmost any project that conceivably could benefit the buying public, the Government or the Association members. Men trained in the industry since its beginning gave freely of their time and thought to this enterprise, and it represents a sincere attempt to insure the public getting a good filing cabinet from each and every Association member. The Specifications themselves are of value to every member as a catalog of what is suitable for certain purposes, and what is not suitable. It is a complete manual.

STANDARDS OF PERFORMANCE

What would the logical result of absolute standardization be, if this meant:

1. Uniform dimensions, construction and interlocking features for every manufacturer in the field,
2. Exactly the same raw materials used in the manufacture of every file,
3. Identical finish, exterior appearance, drawer capacity, etc.?

Such a theoretical condition is probably described in half a dozen texts on economics and sociology. It is almost unnecessary to go into it here, as the results are obvious Here are a few of them, as they appear from a practical point of view:

1. Immediate departure of all designing and development engineers for other fields, or for the poorhouse. What would be the use of having them?
2. Immediate stagnation throughout the field, with competition existing only inside the shops, not in the customer's place of business.
3. A frantic effort to cut costs on the part of all manufacturers, with the inevitable labor troubles and other results of corner cutting.
4. An ever increasing disability of the consumer to get equipment to fit new situations.
5. A total lack of pride in his product on the part of every manufacturer.
6. A complete lack of touch with the improvements in raw materials.
7. A very serious eventual hampering of business development because of the lack of proper equipment with which to work.
8. The eventual integration of the industry into one organization,—a condition that is totally against our present economic order, which is truly a product of natural laws.

This is certainly a complete enough indictment of an unsound theory.

Now, there is another kind of standardization that has not been touched upon. In fact, the word that describes it has not yet been used in this article. Up until this point we have talked about materials, about gauges of steels, about finishes,—about uniform dimensions. And there has been an objection, a difficulty arising in connection with every concrete effort made and with every theory put forth.

Let us forget that filing cabinets are made of steel and that they used to be made of wood. Let us forget everything except the fact that filing cabinets are made to file records in. It doesn't make any difference whether the drawers are 24 inches deep or 24 feet, or whether the cabinet is made out of steel or solid gold, or whether the slides are heavy or light, or whether it has any slides. Let us understand that the best possible filing cabinet is the cabinet that helps its user file records in the best possible way.

In other words, let us standardize on *performance.*

If a machine can do what it is supposed to do, is it satisfactory or isn't it?

One of the members of the sales force of the industrial division of the Continental Motors Corporation recently made the statement that "the length of a man's legs does not have to be regulated. It is necessary only that they reach the ground." The implication is obvious.

The question immediately arises: Who can lay down the "standards" of performance? What body is capable of saying whether a filing cabinet properly accomplishes its purpose?

We have already seen, surely, that the body would have to be disinterested absolutely. We have also seen that it must be scientifically capable.

Now it happens that the making and selling of fire protective safes is an important part of the filing equipment industry. It is perfectly natural that a manufacturer who makes "machines" to file records in, is also interested in "machines" to *protect* records in, against fire, molestation and theft. Every major manufacturer in the field sells safes for the protection of records of all kinds and also sells the interior equipment in which the contents of the safe are filed. Here is a job for standardization indeed! The destruction of valuable records by fire runs into millions every year. How can the customer know that he is getting the particular safe that will suit his purpose best? How can he procure—after he has found out what kind of a fire risk he has—the kind or grade of safe that will meet that fire risk successfully?

In Chicago is a scientific institution maintained by the National Board of Fire Underwriters and known simply as Underwriters' Laboratories, Inc. Let us quote from a book, "The Truth about Testing Safes."

This institution (Underwriters' Laboratories) occupies a peculiar place. Utterly impersonal, completely non-commercial and as impartial as the weather, it pays no dividends, makes no profits and devotes all its energies to one undeviating purpose,—the ascertainment of fact. In doing this it has built up an extraordinary plant and has assembled a large force of technical engineers The nature of its work is summed up in an extract from an official statement, as follows:

> Underwriters' Laboratories, Inc., was established and is maintained by the National Board of Fire Underwriters for service, not profit.
>
> The object of Underwriters' Laboratories is to bring to the user the best obtainable opinion on the merits of appliances, devices, machines and material with respect to life, fire and collision hazards, and theft and accident prevention.
>
> The work is undertaken as one means of reducing the enormous and disproportionate loss of life and property by fire and accident.

It is unusual to find a non-commercial institution operating in a commercial world as a direct offshoot of a great business interest. Yet the reason is simple enough: the insurance companies require accurate knowledge of all elements of hazard if their underwritings are to be more than mere guesswork and gambling with chance. Such knowledge, therefore, is the foundation for a vast system involving billions of dollars' worth of protection and underlying the entire credit structure of American business. With this incalculable interest at stake, personal opinion and human bias must be eliminated and knowledge must be painstakingly obtained through the highest technical skill and the most complete equipment. . . . In 1915, the Underwriters' Laboratories issued to manufacturers some fifty million labels, but in 1921 it issued approximately five hundred million, and this huge increase was a natural growth during only six years' time, being made virtually without efforts. . . .

Underwriters' Laboratories is not physically confined to the buildings on East Ohio street in Chicago. It has a large laboratory

in New York and many smaller testing stations throughout the country. It has branch offices or agencies in every large city in the United States and Canada, and a connection in London, England.

The remarkable thing about the whole matter is the fact that the above quotations were taken from a book *sponsored by the National Association of Steel Furniture Manufacturers!* Talk about finding diamonds in your own back yard!

The Underwriters' Laboratories test safes by subjecting them to conditions which duplicate actual fire conditions as closely as possible. It is not proposed to go into detail about this. At any rate, safes are placed in furnaces that have mica glazed observation holes in them, and the interior temperature of the furnace is sent up to as high as 2,000° in some cases. Papers are placed within the safe, and thermocouples, inside and outside, register the temperature. While the safe is red hot, it is dropped thirty feet on an uneven rubble of brick. Fire hoses are turned on it—it is subjected to every terrific test that a safe would have to meet in a fire, and then some. If it passes these tests, it is awarded a label. If it doesn't, it isn't.

Three grades of labels are issued. The Laboratories insure that the manufacturer is keeping up the standard because their representatives can go out into the field and take a safe for testing at any time. These representatives also visit manufacturers' shops at any time they wish.

The result is that the customer can get the kind of safe that his fire risk demands.

The Laboratories engineers don't care what a safe is made of (minimum specifications) and they don't care how wide or tall it is (exterior dimensions and interlocking devices). They are interested only in this: Will it protect the records it is supposed to protect? Will it perform?

So here is our answer to what is the best kind of "standardization" for filing equipment.

Instead of going into tortuous detail about minimum specifications, why not let some impartial, impersonal group find out what a filing cabinet will actually do in service?

If the user is going to file heavy material and the drawer is going to be moved in and out at very frequent intervals, it is logical to assume that he will heed about the strongest and best filing cabinet made. If the cabinets of all Association members came up to the proper standard of performance, he could rest assured that if he bought a "Grade A" cabinet that it would last. If he wanted a cabinet for inactive or semi-active records, a "Grade C" would probably fill the bill. Let appearance, company reputation, service, indexing methods and knowledge of the problem decide whose cabinet to buy.

After all, the consumer is the person that makes the rules and is the one to be satisfied. He has a way of seeing to it that things he doesn't want and can't use are speedily tossed out of a manufacturer's line. If we want a simplification process, a cutting down of the number of items in a line, let us educate the consumer, for with him lies the decision. He can be persuaded, but he can't be forced, though some advertising "experts" believe to the contrary.

Where would we find a scientific group to test our filing equipment as efficiently and scientifically as the Laboratories test safes? This question should eventually answer itself, because there is surely a need for this in our industry.

Some day the Association will find a way to do it. One group that imme-

diately suggest themselves are the technical colleges of the country. This is merely a hazarded guess, but it is worth investigation. Could not such work be done at Rensselaer, M. I. T., Rose, Carnegie, Pittsburgh, or at any of the engineering schools of the large universities?

Again, this group must be impartial, impersonal, disinterested. It must know the office and filing equipment field thoroughly and be in touch with it constantly, in order to provide for the new situations that are constantly arising. A certain standard of performance, in the filing equipment field, may change overnight with the bringing on the market of some new bookkeeping machine or some new method of filing records. A standard must change, it must be flexible.

The materials that filing equipment is made of will take care of themselves. If some new alloy that allows of easier fabrication is developed, it will be adopted soon enough, and if this new material makes it possible to make better filing cabinets, then the impartial testing group can demand *more* from every grade. And the consumer is taken care of the way he should be.

The consumer is the man that makes decisions that affect the fundamentals of trade. Nobody else does.[1]

[1] I thank J. D. M. Phillips, Secretary of the National Association, and David E. Hunter, Chief Engineer of the Shaw-Walker Company without whose help this article could not have been written.—JOHN L. STEPHENS.

Standard Purchase Specifications in Railroad Operation[1]

By Robert P. Brecht
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THE railroads of the United States spend annually about $3,000,000,000 in the purchase of materials and supplies—a volume of purchases second only to that of the Federal Government. The number of commodities included in this immense purchase order run into the hundreds of thousands, for a railroad's activities ramify into many fields: operations must be extended, new lines developed, old lines improved, tracks, roadbeds and rolling stock kept in the best operating condition, bridges must be built, buildings of various kinds constructed, telegraph lines opened and kept ready for service, water service provided at strategic points—to give only a hurried glimpse of the teeming world included under the category of railroad operations. And all of these activities require supplies and materials of a kind and quality best adapted to the particular need that must be served.

By simplification or standardization of purchase specifications is meant the elimination of unnecessary materials and specifications, and the adoption by all railroads of a uniform specification code. Where the development of these specifications carries beyond the immediate interests of the railroads and is felt in other industrial activities, the attempt is made to secure uniformity of specifications among all interested parties. The possibility of great savings through the elimination of unnecessary duplications and kindred wastes in purchasing has greatly stimulated the movement toward standardization of purchase specifications.

[1] The material presented in this paper is taken from Reports of the Special Committee on Standardization of the American Railway Engineering Association kindly furnished the writer by Mr. W. C. Cushing of the Pennsylvania Railroad. Bulletins Nos. 291 and 300, American Railway Engineering Association.

Tendency Toward Diversity

In coping with its individual purchasing problem each railroad in the past has developed specifications for the materials it has used. In developing these specifications from its sole standpoint duplications were bound to arise as between roads. Identical materials would be purchased under different specifications, and a great variety of materials would be made to serve identical purposes.

Two examples only will be cited to illustrate the tendency toward diversity. In the Directory of Commodity Specifications, prepared in 1925 by the Bureau of Standards in coöperation with the Bureau of Foreign and Domestic Commerce and the American Engineering Standards Committee, there are listed twenty-two specifications for tie plates. The American Railway Engineering Association has specifications covering two distinct grades which should cover all normal demands. Twenty-eight specifications for splice bars are listed in the Directory, five distinct grades of steel specified. The American Society for Testing Materials have specifications for all five grades.

A more careful scrutiny of the cases given above would probably disclose a closer identity of items and specifications than is gathered by a cursory examination of the data. No two groups write

specifications in exactly the same way. Some discounting of the charge of excess material and specifications frequently laid to the railroads must be made, and yet diversities do exist. The railroads acknowledge this fact, and their activity in the direction of simplification is evidence of their desire to improve the situation.

DIFFICULTIES TO SNARE THE UNWARY

The pathway of the reformer is usually beset with difficulties. The protagonists of standard specifications for the railways are no exception to the rule, and while the difficulties surrounding the problem are not insuperable, they are real and must be conjured with. These difficulties may be divided into two classes, (1) those incident to the development of standard practices, and (2) those incident to securing universal adoption of these practices.

Each railroad presents a nexus of individual peculiarities. Operating conditions vary from one road to another and demand differences in specifications of materials. Track appliances and materials must be designed to meet the requirements of varying stresses set up by different densities of traffic and diverse concentration of load application, as transportation agents' roads vary from heavy and fast trunk line carriers to the branch line serving small communities in sparsely settled areas. All of the variations in this sliding scale of importance may be found within the trunk line railroads. Specifications for material and for size and dimensions of appliances must necessarily arise in order that they endure under the varying service conditions.

The problem of purchasing is complicated still more by other considerations: by the Interstate Commerce Commission requirements for an open market, by the inventor and manufacturer of proprietary articles, and by the demands of shippers upon the traffic department of railways for reciprocal business.

All of these difficulties can be resolved but only through slow and deliberate effort and only in coöperation with all parties normally using the commodities.

Then there are the problems that must be faced in securing the adoption by all railways and interested parties of the specifications decided upon. There are a great number of roads that must be corralled and brought into an attitude of acceptance. There is the difficulty of keeping them *sold* upon the value of the recommended practice. And this in turn introduces the added difficulty of keeping the standard up to date. Inertia of habit must be overcome in securing the use of the standard in the first place and the whole process repeated when it is found necessary to introduce the revision. Standardization of specifications, like all standardization in modern industrial society, is a dynamic concept. There is no stopping, no marking time, but continual struggle to the better level of adaptation. This presupposes a permanent organization upon which devolves the task of investigating, developing and revising the standards, and of *selling* the results of its steady efforts to the railways. It demands an enthusiastic leadership to guide, to sustain and to motivate the organization in its constant quest.

Three pertinent questions, then, may be addressed to the present inquiry: (1) What organization carries on the work of promoting standard practices for the railways? (2) How does this organization develop and secure the use of these practices? (3) To what extent are recommended practices actually used by the railroads?

AMERICAN RAILWAY ASSOCIATION

The parent body interested in fostering the development of standard specifications for the railroads is the American Railway Association, composed of the following seven divisions and several special committees:

Division

I. Operating
  Telephone and Telegraph
  Committee on Grade Crossing Protection and Trespassing
II. Transportation
III. Traffic
IV. Engineering
  Construction and Maintenance Section
  Electrical Section
  Signal Section
V. Mechanical
VI. Purchases and Stores
VII. Freight Claims

Divisions I, IV, V, and VI are all interested in the development of standard practices, many of the individual members of these four divisions serving on sectional committees of the American Engineering Standards Committee, but the major rôle in the development work has been assigned to the Construction and Maintenance Section of Division IV, Engineering.

The American Railway Engineering Association, representing the organization of Section I of the Engineering Division, carries on its work of promoting standard practices through a Special Committee on Standardization and numerous Standing Committees working under the direction of the Board of Direction of the Association. Results in the form of adopted standards are published in a "Manual of Recommended Practices" and distributed among the railroad membership. It should be noted in passing that this Manual includes recommendations covering all phases of standardization.

Method of Development

The method by which standard specifications are developed and the several parts played by the above groups in developing them and securing their use may be gathered from the following digest of the "Policy of Procedure concerning Recommended Practices."

A Standing Committee shall be continuing sponsor of its own adopted recommended practices embracing the following duties:

(1) An annual review of each manual-incorporated practice with the recommendation for revision when found desirable.

(2) A statistical survey periodically to ascertain the extent of use by the association members of the practice under study.

(3) Selection of an Association-adopted recommended practice as of mutual interest and importance to special industry and technical associations, or as of national scope, recommending to the Board of Direction in the first instance that it be laid before the proper coöperative committee or technical association, and the American Engineering Standards Committee in the second.

The Board of Direction after favorable action upon the recommendation of a sponsor committee shall proceed in the case of Industrial- and Association-Mutual interest to place the proposal before the interested body, and in the case of national interests authorize the Secretary to request the approval and further action of the American Railway Association.

The Special Committee on Standardization shall keep informed of the rules of procedure and general fields of activity of the associations and committees which may be considered to have interests in common with this Association, and shall be kept informed of

the special coördinating recommendations of standing committees in order to act as an advisor to the Board of Direction.

The threefold character of the work of developing standard specifications should be noted: (1) those standards concerned with the railroads exclusively, set up entirely by Standing Committees under the authority of the Board of Direction, (2) those intimately associated with some other technical or industrial activity, developed cooperatively with the parties interested, and (3) those national in scope developed under the aegis of the American Engineering Standards Committee.

Liaison is maintained with the American Engineering Standards Committee by the American Railway Engineering Association as representive of the American Railway Association, although, as it was previously pointed out, members of other divisions of the latter serve on many sectional committees of the American Engineering Standards Committee.

The present Standing Committees of the American Railway Engineering Association are those on Roadways, Ballast, Ties, Rail, Track, Buildings, Wooden Bridges and Trestles, Masonry, Grade Crossing Design, Protection and Elimination, Signals and Interlocking, Records and Accounts, Rules and Organization, Water Service, Yards and Terminals, Iron and Steel Structures, Economics of Railway Location, Wood Preservation, Electricity, Uniform General Contract Forms, Economics of Railway Operation, Economics of Railway Labor, Shops and Locomotive Terminals and Coöperative Relations with Universities. From the foregoing it will be seen how extensive is the work of standardization undertaken by the American Railway Engineering Association.

The attitude of the American Railway Engineering Association toward the work of developing and securing the use of standards is of interest.

"Progress in the elimination of unnecessary specifications, designs and appliances must come through the laborious and painstaking process of education. Active minds working for the good of the service in which they are engaged are evolving new ideas continuously, and the alert questioners examine quickly into their merits. Through merit alone will they survive. Those who are in the same field of activity, therefore, educate each other.

"For this exchange of thoughts and ideas there must be a forum, and that forum is the technical societies, in the membership of which meet on common and equal ground the consumer, the manufacturer, and the interested men of science, the engineer, college professor, the government engineer, the general practitioner and the consulting engineer. In this forum certain principles are evolved and set up as a desirable mark to be attained. Gradually a greater and greater number reach this mark and many accept some of its principles without accepting all. Moreover, the active brain of a gifted member makes it necessary to introduce changes from time to time, which necessarily adds to the appearance of slowness in the march toward improvement. No sooner is approved practice developed and set up than new suggestions require change.

"The forum machinery in which the consumers of railway appliances are participators is:

"(1) The American Railway Association, Division IV—Engineering Section I—Construction and Maintenance.

"(2) The American Society for Testing Materials.

"(3) The American Society of Civil Engineers."

The above expression indicates the thoroughly sound approach to the problem of standardization on the part of the leadership.

SURVEY OF THE EXTENT TO WHICH STANDARD SPECIFICATIONS ARE USED BY THE RAILROADS

In securing the adoption of its recommended practices the American Railway Engineering Association realizes that it is utterly impossible to force its individual members to the use of the standard. The only policy it has been able to pursue is to urge all members to avail themselves of the practices recommended in the Manual. It realizes further that the standard will finally be adopted only when the recommended practice proves its value for the purpose. No member of an association will make use of a recommendation, which as often as not is a compromise, unless its value is so great as to make its use profitable to his company. Thoroughness of work and constant revision are absolutely essential then to the widespread adoption of a standard.

In discussing the extent to which standard specifications have been adopted it will be well to divide the subject into two parts, one dealing with the activities of the American Railway Engineering Association in securing the use of its "Recommended Practices," the other dealing with its activities in the national movement.

Recommended Practices

Insufficient information in the reports to the various Standing Committees makes it difficult to present a quantitative idea of the extent to which standards have been adopted. There will be sufficient data presented, however, to afford a good estimate of the valuable service the Manual performs.

There are found to be three degrees of use for which the standards are available or adaptable for inclusion in the individual specifications:

(1) Adoption verbatim, or nearly so, of the plans, specifications, instructions or rules.

(2) Incorporation of the fundamental or main items of importance in settling upon and maintaining unification of methods.

(3) Acceptance of the general influence of the data, and citations, in order that one's own practice may be in general accord.

The reply of the Missouri Pacific Railroad indicates the high esteem placed upon the work done by the American Railway Engineering Association committees: "Probably 70 percentum of standard plans, specifications and practices are American Railway Engineering Association or close thereto."

Considered under general headings comparable to the work of the Standing Committees, the experience may be summarized as follows:

Roadways

Thirteen or more subjects are treated under this heading. A typical reply to the question of use is that of the Baltimore & Ohio Railroad—"Generally follow recommendations of Manual, in so far as our conditions will permit."

Ballast

Forty-seven testified to the following extent of use and seemingly in the first degree above:

	Roads
(1) Ballast section for gravel	16
(2) Ballast for stone	12
(3) Specifications for stone ballast	17
(4) Specifications for washed gravel ballast	16
(5) Using the ballast test	14

In addition the Illinois Central and Baltimore & Ohio state that they are

making use of the specifications for ballast tools.

Ties

The "Specifications for Cross Ties" and the "Specifications for Switch Ties" became in 1927 a "National Standard" by approval of the American Engineering Standards Committee. Almost universal use may therefore be accepted.

It is probable, too, that the "Specifications for Dating Nails" are accepted by those whose practice it is to make use of them.

The Pennsylvania Railroad states that the "Specifications for Tie Plugs" have been accepted *in toto* as its own.

Rails

Fourteen roads furnished information on this item. Specimens of their experience are listed below.

Rail Sections

The 90 lb. RA-A has been used by the Southern Pacific, Union Pacific, and with base modification by the Santa Fe.

The 100 lb. RE is being used by the Canadian Pacific.

The 110 lb. RE is being used by the Santa Fe, Nashville, Chattanooga & St. Louis.

The 130 lb. RE is being used by the Lackawanna, Baltimore & Ohio, and Southern Pacific.

Rail Specifications

The Nashville, Chattanooga & St. Louis, Pennsylvania, Santa Fe, Rock Island, Burlington, Louisville & Nashville, Lehigh Valley, Reading, and Baltimore & Ohio report the use with some modifications of the rail specifications. It is believed that this is a small proportion of those making use of them.

Specifications for Joint Bars, Heat Treated

These are followed quite closely by the Baltimore & Ohio and Santa Fe, and the Reading without modifications.

Specifications for Track Bolts, Heat Treated

These are followed quite closely by the Baltimore & Ohio and Santa Fe, and by the Nashville, Chattanooga & St. Louis and Reading without change.

Girder Rail Sections and Girder Rail Specifications

Both of these are used by the Pennsylvania Railroad. Several of the railroads replied that while the recommended practices were not adopted by them *in toto*, they were used as the basis for standards, and considered as a general guide for determining the practice where conditions permitted.

Track

Plans and specifications for frogs and switches, especially the manganese work, have been quite generally accepted. In addition the designs for track spikes and track tools are quite widely used. The Baltimore & Ohio, Nashville, Chattanooga & St. Louis, Louisville & Nashville, Reading and Pennsylvania replied to that effect. The Pennsylvania Railroad has adopted the specifications for steel track spikes *in toto*. These specifications have been made a tentative standard of the American Society for Testing Materials.

Buildings

Specifications for railway buildings have been prepared along with skeleton designs for miscellaneous railway buildings including details of roofs and flooring.

The Baltimore & Ohio and Seaboard Airline state that they work along the same lines.

Wooden Bridges and Trestles

"Grading Rules and Classification of Timber and Lumber for Railway Uses" have been prepared in coöperation with other societies and the industry affected.

Masonry

"Specifications for Portland Cement" have been made a "National Standard" by adoption of the American Engineering Standards Committee and coöperating bodies. Many of the "Methods of Test" for aggregates employed in concrete making have become national standards. The Illinois Central, Union Pacific, and the Pennsylvania report their adoption as standard. The Pennsylvania adds that it has adopted the "Specifications for Billet-Steel Reënforcing Bars."

Water Service

The Illinois Central has adopted the "Specifications for Cast Iron Pipe and Special Castings," and the "Specifications for Hydrants and Valves." Specifications for the chemicals for several water softeners have been provided, and also "Specifications for Wooden Water Tanks and Timber Substructures," and "Specifications for Steel Water and Oil Tanks."

Iron and Steel Structures

The Baltimore & Ohio, Rock Island, and Union Pacific use the "General Specifications for Steel Railway Bridges" as a basis for their own. Two other projects recently completed are "General Specifications for Steel Turntables," and "Specifications for Movable Railway Bridges."

Wood Preservation

"Specifications for Creosote Oil" have been generally adopted by the railroads.

From the above brief survey of railroad uses a number of things are apparent. The work of the various Standing Committees of the American Railway Engineering Association has been extremely wide in scope and very thorough. The railroads show a willingness to use the recommended practices as they are educated to the value of the work. These two facts would seem to indicate a continued, steady rate of progress in the development and adoption of standard specifications by the railways in the future.

ACTIVITIES IN THE NATIONAL MOVEMENT

Of the two hundred and thirty-eight projects having official status before the American Engineering Standards Committee in 1927, forty odd comprised studies in which the American Railway Association and the American Railway Engineering Association had a credited representation, officially cooperating in the sectional committee work. The interests of these committees are wider than the development of material specifications. Many of the projects are directed toward the development of safety codes, scientific and engineering abbreviations and symbols, the rating of electrical machinery, the rating of rivers, etc. Perhaps half the work, however, is directly interested in the setting up of specifications for material and appliances.

The American Railway Engineering Association is itself the sponsor for four projects only. These are the General Specifications for Steel Railway Bridges, Specifications for Movable Railway Bridges, Insulated Wires and

Cables (other than telephone and telegraph) and Specifications for Railroad Ties. Of the four the Specifications for Ties have been definitely adopted as National Standard. The remaining projects are still under study. When it is recalled that the expressed attitude of the Association is definitely against carrying anything to the American Engineering Standards Committee unless it is absolutely of national interest, it is readily understood why the Association has not stood sponsor to more projects.

CONCLUSION

The status of standard purchasing specifications in railway operation may be summarized as follows: The American Railway Association working through its member, the American Railway Engineering Association, has established a permanent organization for the development, revision, and promulgation of standard practices, embracing all phases of standardization, an important element of which is the code of specifications covering materials and appliances. The attitude of the American Railway Engineering Association toward the problem of standard practices is fundamentally sound, and the work of its Standing Committees thorough and deliberate. Through its Manual of Recommended Practices it disseminates its findings among the membership and urges their adoption. By membership in the American Engineering Standards Committee it takes an active part in the national movement. The railroads are considering its efforts in an encouraging manner and adopting them as standard practice wherever convinced of their applicability. It requires no gift of prophecy to predict a steady and ever-widening area of usage for the standard material specifications established by the American Railway Engineering Association.

Standardization of Purchase Procedure for the Federal Government

By Major A. H. Erck
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YEARS ago when the instrumentalities of the Executive Branch of our Government were few and the field of their administrative power and control was more or less sharply defined, no common endeavors or mutual interests were involved to create a necessity for coördination. There were no administrative emergencies sufficiently pressing to cause the Chief Executive to demand standard procedure on the part of his agencies in the transaction of governmental business.

The various departments operated practically independently of each other within the limits set by Congress and under this system many different methods of handling Government business grew up, together with unnecessary restrictions, and frequently inefficient methods in the procurement of supplies, as well as in other administrative activities. Honest prejudices, obstinate jealousies and the desire of ambitious officials to remain unfettered in the conduct of bureau business all contributed to the maintenance of this system.

At the end of the World War the Government, burdened with an enormous national debt, was confronted with the imperative problem of securing greater efficiency and economy in Federal expenditures in order that the budget might be balanced and that the enormous amount of war surplus which had accumulated might be disposed of to the best interest of the government. The most superficial examination of the problems confronting the Government in 1921 revealed that savings and general efficiency in the operation of the Government could be gained only through coördination.

The passage of the Budget and Accounting Act of 1921 and the establishment by Executive Order of the Federal service of coördination provided the President for the first time with instrumentalities through which the fiscal problems of the Government could be met and the business activities of the various departments properly coördinated.

Coördinating Agencies Concerned with Procurement

The Federal coördinating agencies concerned with purchases are the General Supply Committee, the Federal Purchasing Board, the Coördinator for Purchase, the Federal Traffic Board, the Federal Specifications Board, the Interdepartmental Board of Contracts and Adjustments, the Interdepartmental Board on Simplified Office Procedure, and the Federal Business Associations organized throughout the country to handle local questions of coördination.

Consolidation of Purchases

A buyer is in the most favorable position to obtain the best prices when he is able to enter the field of production with his requirements consolidated and supported by a reserve stock sufficiently large to reduce hurried purchases to a minimum and yet small enough to be susceptible of frequent turn-over.

The United States Government will be in a position to exert the maximum of its potential buying capacity only when it shall be able to synchronize demands, consolidate requirements, regulate the distribution of reserve stocks, and transfer excess in one quarter to supply shortage in another.

This problem in Government buying is to organize the separate purchasing units in a manner so flexible that the mass effect of their combined buying power may be secured by united and concerted effort without in any degree sacrificing the sensitiveness of a departmental organization to the pressure of the needs of its own department.

Included in the aggregate of all articles purchased by the Federal Government there are some that by reason of their general use may be designated as Federal Property at Large in contradistinction to articles that are primarily departmental in character. For articles of this type, such as surgical absorbent cotton, explosives, chemicals, balloon silk, and so forth, it is possible now so to synchronize estimates of future requirements as to include the total in one statement of needs of the Federal Government as a whole.

Any one of the participants in a joint purchase may act as agent for the group. The agent department, when so authorized in writing, may include the separate requirements of the group in a single advertisement. The award may be made either by the requiring department or by the agent department when authorized to do so. Contracts following award may be made separately for each department or contained in a single instrument signed by a duly authorized representative of each department forming a party to the transaction, for and on behalf of his department, and so drawn as to be binding upon each party thereto for only so much of the contract as involves that department.

Such joint transactions for the purchase of gasoline have been carried on in the city of Boston with economy and to the satisfaction of all participating departments, and steps are now being taken to expand this method of purchase to include other articles wherever economy will result therefrom and satisfactory deliveries can be made thereunder.

Coöperative purchase by actual collaboration in advertising, awarding of contracts, and storage of material is approved as sound in principle.

UNIFORMITY IN GOVERNMENT PURCHASING

Uniform methods of purchasing bituminous coal are being placed in operation. Departments owning but few automobiles are now able to obtain the trade discount allowed on repair parts, in consideration of the large number of automobiles owned by the entire Government.

Prospective bidders can, by application to a central contact office, be included on the mailing lists of all departments to receive copies of invitations for bids.

The methods of collecting and disseminating information regarding dealers debarred from bidding on Government business because of unsatisfactory performance under contract has been unified and one list is now prepared and sent at regular intervals to all Government activities requiring this information.

ELIMINATION OF WASTE BY MEANS OF SIMPLIFIED PRACTICE

Simplified practice means the reduction of variety in sizes, dimensions, and immaterial differences of every-day commodities, the purpose being to eliminate waste, decrease costs and

increase values in production, distribution and consumption. Great advancements in living standards are usually brought about by new and basic inventions, but an even larger field of opportunity has been found in the elimination of economic waste. Usually we think of waste as something unused, a surplus, perhaps, of a quantity of material left unsold and which may perish. Waste is something more than that; labor that is unemployed is wasted, and seasonal operations frequently involve waste.

The program of simplified practice, which has been under way for some time, looking to the elimination of the unnecessary varieties in commodities, does not affect commodities which are based on style, art, or other expressions of individuality.

The United States Government has tackled the problem of waste in industry through the Division of Simplified Practice of the U. S. Department of Commerce. The activities of this division are purely coöperative in character. Its chief function is to serve, when requested, as a centralized agency to bring producers, distributors and consumers of specific commodities together and to support the recommendations of those interested when they shall mutually agree upon simplifications of benefit to the industries and the public concerned.

During the last five years the Division of Simplified Practice has coöperated with more than 400 industrial groups in the elimination of excessive varieties, sizes, types, etc., of commodities which these groups either manufacture or use. The savings to these groups have amounted to millions of dollars annually through the reduction of stocks, lowered production costs, improved quality of product, and increased purchasing power of the consumer.

A glaring example of variety of purchase of any one commodity as to size, type, quality, etc., by the Federal Government, is that of envelopes.

It is roughly estimated that two years ago there were over 200 different sizes and grades of envelopes used by various departments and establishments of the Government. These were secured either by Post Office Department contracts or through requisitions on the Government Printing Office. Award of contracts on envelopes for the current fiscal year was made on the estimated requirements of 241,090,500 at an estimated cost of $396,429.77, at an average cost of 64 cents per thousand.

The estimated requirements for envelopes for the current fiscal year shows but 60 item numbers, making a reduction of 140 in the sizes of envelopes used by the Federal Government today.

STANDARDIZATION IN GOVERNMENT PROCEDURE

Modern business administration shows an increasing tendency to become standardized. In large organizations standardization is essential to the establishment and maintenance of a unified business policy and to the coördination of the activities of the several departments of the business.

Before proceeding to the application of standardization to Government purchasing, it may be well to consider briefly some of the principles of standardization.

Standardization, like efficiency, is not an easy term to define and is not always understood in its true sense. It might be defined as the adoption of the best practice in the unification of the methods and processes of industry or general business, or other lines of endeavor which involve repetition of work. Standardization may be considered under several aspects.

Standardization of nomenclature en-

ables purchaser, seller, and manufacturer to use and understand the same language. It is very important that terms used in specifications and contracts be concisely definite. This alone would greatly facilitate the efficient handling of purchases and deliveries to meet specific needs. Most of the specifications today contain ambiguous language, and this should be corrected.

Standardization of variety, or simplification, involves the elimination of unnecessary types, shapes, grades, and sizes of manufactured articles. Waste in industry is largely due to an overmultiplicity in the number of products, as well as to inefficiency of process. There is also a large waste due to deterioration, obsolescence and capital charges carried on idle stock of unnecessary material and products. "Survival of the fittest" will undeniably result from simplification, if handled with good technical advice. Standardization, furthermore, is essential to speed in production.

Standardization of dimensions ensures ready interchangeability of supplies, and the proper inter-working of parts which may be manufactured or assembled by different manufacturers. Standardized parts manufactured in different plants can be assembled into the completed article, disassembled and reassembled with the assurance that all the respective parts are interchangeable.

From a broad viewpoint, standardization may be applied to materials, methods, products and uses.

One of the most difficult disputes to settle in purchasing is the continual quarrel between quality and price. This situation can be cleared only by proper and adequate specifications. Purchasing by bids based on well formulated specifications really sets an upper and lower limit to the quality. The too good is eliminated in the price comparison of bids; the too poor is rejected by the minimum quality specified. The result is that the deliveries are of that good-enough quality range, above and below which lies waste. Net utility per dollar expended is the criterion determining at what level this good-enough quality range shall be set. The specification thus forms the basis on which maker and user meet to determine the quality of manufactured articles. Experience and science unite in making it impersonal and therefore minimize misunderstanding and promote efficiency and economy.

There are many good reasons which should at once impress good business men with the desirability of basing purchases on properly standardized specifications. Lack of standards of quality and specifications, together with inadequate testing and inspection, is costing the business interests of this country tremendous sums each year. This can be corrected by centralized purchasing, based on proper specifications, and followed up by adequate testing and inspection to ensure getting what was contracted for.

The United States Government is the largest purchaser of material and supplies in the world, both as to quantity and variety. The variety of items included in these purchases runs from hosiery to hardware and from forage to fuel. It has been recognized under the new budget system that when the Government goes into the market it must have suitable quality standards on which to base its selections. Efficient procurement has called for the uniform application of approved methods of purchasing to all agencies of the Government. These approved methods require standardized contracts and standardized specifications.

The operation of the General Supply Committee has resulted in standardiza-

tion of supplies used in common by Federal activities, in a reduction of the number of special items purchased, and in a reduction, by reason of the larger orders, in the prices paid. Annual contracts for commodities subject to wide fluctuation in price have been discontinued, and consolidated definite-quantity purchases are being made.

STANDARD FORMS FOR CONTRACTS

Ten years ago the Government had no standard form of contract; no law prescribing the language of the contract; no unified agency to say what language should be used. Some of the larger departments had different forms and different methods in their several bureaus. There were 396 separate forms of contracts and leases and 224 separate laws with which to conform.

To estimate the great waste that resulted from such a condition of affairs is next to impossible, and the first great work of coördination was a revision and standardization of the Government's contracting activities.

Up to February 1, 1927, such Standard Government forms as Invitation for Bids; Form of Bid; Instructions to Bidders; Construction Contract; Bid Bond, and Performance Bond, had been adopted and made effective.

The Federal Specifications Board is composed of one member from each department and establishment which purchases materials and supplies in accordance with specifications. The Board has 76 technical committees handling the details under the supervision of the vice chairman. These technical committees have been formed in recognition of the fact that generally the opinion of a small group of qualified individuals is better than the opinion of any one expert, and that difference of opinion can best be eliminated in informal conferences.

In the Government service there is the greatest aggregation of technical and scientific talent to be found in this country, covering every branch of knowledge, and the best of this talent is utilized in the personnel of the various technical committees.

A specification is selected or written by the technical committee concerned, which will be suitable for the uses of all departments and independent establishments of the Government. The coöperation and advice of interested commercial and industrial concerns is requested, and their recommendations are fully considered by the technical committee. The specification as agreed upon by the technical committee is then submitted for comment and criticism to all departments and establishments of the Government, through their respective representatives on the Federal Specifications Board. At the same time a copy of the proposed specification is submitted to the American Engineering Standards Committee, with a request for their informal assistance in securing comment and criticism from the various interested engineering and and technical societies of the country. All criticisms received are referred back to the respective technical committees for consideration on their merits.

When the specification is finally agreed upon, it is promulgated by the Federal Specifications Board as an official United States Government Master Specification for use in connection with the purchase of material covered by the specification.

This preparation and use of master commodity specifications for the entire Federal Government is an essential step toward the economy resulting from the purchase of materials and supplies in large quantities. In no field of Government operation was there greater need for constructive work than in the field of purchasing

standards. For certain classes of materials and supplies there were almost as many variations in the department's specifications for a given article as there were specification writers. These specifications were developed through the years, and bore the impress of notions, whimsicalities, and idiosyncrasies of officials long since departed. The Government has paid large sums of money for this lack of standardization.

In the selection of specifications for Government use, the Federal Specifications Board is coördinating the interests of the manufacturer and the consumer in a manner which is fair to and understood by both. Eventually all Government purchases will be based on correct standards of quality and practice

Up to the present time, 551 United States Government Master Specifications have been promulgated, covering all of the more important commodities, and their use by all the departments, bureaus and activities of the Government, has been made general by direction of the President.

INSPECTION AND TEST OF MATERIALS

A gradual extension is being made of the use of the inspection service of one department by others, thus eliminating travel and overhead expenses and giving flexibility to the Government inspection service.

For example, inspectors of the Bureau of Animal Industry, Department of Agriculture, inspect provisions and meats for Government hospitals in Boston; for U. S. Shipping Board in New York; for the Army and Navy in many places.

The Secretary of the Navy has made available to all activities of Federal Government the services of Inspectors of Naval Materials. This inspection service will be rendered upon request and will be charged to Federal activities at cost.

The field inspection activities of the Navy are located in various cities throughout the northern, eastern, and western parts of the United States. The southern area has no central inspection office, so inspections in that area are provided for by ordering inspections to be made by whichever office, as determined by the activity ordering the inspection, shows the travel costs of the inspector to be the lowest.

Within the Naval Inspection Districts there is a total of twenty residencies where inspectors are based. These inspectors are qualified to inspect such material as timber, machinery, electrical apparatus, non-ferrous metals and products, boiler tubes, fuel oil and other materials in naval and in general use.

The Post Office Department has recently made arrangements to consider any reasonable request from, and to render service to other departments and establishments in connection with the repairing or storage of motor vehicles owned or operated by Federal activities and to make sales of gasoline and lubricating oil to them, provided it can do so advantageously to the Federal Government and without detriment to the Post Office Department.

The existence of standard specifications and the general use of all Federal inspection services are a very efficient protection against unscrupulous dealers in making Government purchases.

Standardization of materials and manufactured products is believed by engineers and economists to be the coming great principle in business and industry.

Standardization of Farm Products

By Lloyd S. Tenny
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THE development of national standards for farm products has been a process of evolution. At a relatively early date agriculturists who followed the trend of commerce and industry studied in an experimental way the potential benefits that would result from the use of national standards in the handling of cotton and grain, but established trade practices yield slowly to change and improvement, and such changes as do occur are largely the result of economic necessity.

Prior to the organization of the Bureau of Markets (now the Bureau of Agricultural Economics) in the United States Department of Agriculture in 1913, practically nothing had been accomplished in the field of national standardization of farm products. In 1914 the passage of the Cotton Futures Act definitely established the department in this work. In 1916, the Grain Standards Act was passed. The United States Warehouse Act of 1916 also provided certain authority for the promulgation of standards. The use of the official cotton and grain standards of the United States was required in all transactions based on grade, and any standardized grades which may be formulated and issued under the Warehouse Act are also mandatory for the purpose of the act. Besides serving the particular industries these compulsory standards were designed to aid, their use demonstrated to others some of the advantages to be gained by standardization and paved the way for expanding the work.

But the real progress in agricultural standardization has been made during the recent period of agricultural depression when every function of our marketing machinery has been tested with a view to the elimination of waste. The movement has been further expedited by the development of specialized agriculture which has rapidly changed the marketing of farm products from a local or regional problem to one of national and even international significance.

The standardization of agricultural products, although in many respects a part of the general movement, stands by itself, in that problems of standards having to do with the natural products of the soil, and of animals require peculiar attention.

The means used in securing the standard products and practices may not be important. We may secure them through coöperation between members of the industry, through consolidation or concentration of industry into a few large companies or associations, through the use of Government agencies, or even through law as a mandatory matter. The means used may be different, but the result must and will be much the same —*the products will actually be standardized.* When that has come about, we will have the sound platform or foundation on which we can build a successful industry.

Benefits of Standardization

Standardization is basic to successful marketing. Moreover, it is the definite foundation on which rest most of the individual functions which go to make up the whole process of marketing.

Only a brief review of its benefits is needed here.

Standardization supplies a common language for commerce. It makes general the use of certain terms the exact meaning of which is understood, in just the same way, by the producer who may be in the far West and by the dealer who may be in New York City and by the buyer or commission merchant who may be located in Chicago. Thus a choice grade steer is a choice grade steer whether it is being sold on the range or handled in the Chicago stockyards or sold on an Eastern market. Moreover, a roast from a choice grade steer is now a choice roast, whether bought in Chicago or New York.

Standardization is essential to the upbuilding and maintenance of any nation-wide quotation or market news service, and essential to the user if he is to be able to compare market prices and make a choice of markets. One of the first demands on the Bureau of Markets was for the organization of a telegraphic market news service for fruits and vegetables, in 1914. This service was scarcely under way before it became evident that growers and shippers had no way of knowing whether variations in prices in the reporting markets represented differences in the market demand or simply differences in the actual quality of the product. It became evident that standardization would have to be developed side by side with the development of the market news service.

Standardization is basic to the safe and successful use of credit. Particularly is this true when farm products are to be used as collateral for loans. The United States Warehouse Act, under which warehouses that meet certain requirements are licensed by the U. S. Department of Agriculture, requires that whenever grades are specified on the warehouse certificates, which are commonly used as collateral for loans, they shall be specified in terms of United States standards.

Standardization is the one safe basis for advertising—standardization in both output and product. In the long run it is useless and wasteful to advertise a product of which there is not a dependable supply at all times or to advertise a product that does not come up to the advertised description and bring satisfaction to the consumer.

Standardization makes possible the analysis of the production and the marketing of a commodity, the analysis of the business in that commodity, and it makes possible the analysis of a production region or of a market. It renders the analyses of various production regions comparable, and the same with analyses of markets.

Standardization facilitates the settling of disputes as between shippers and dealers, buyers and sellers; it offers a safe basis for the settlement of claims and damage suits. It is the only safe basis upon which equitable inspection services can be built either at shipping point or in the markets. It is especially useful in coöperative marketing in that it affords a basis for pooling the products of various growers to enable all to share alike in the season's sales.

METHOD OF WORK

Although from time to time the Government has found it necessary or desirable to enact legislation making improvement through standardization imperative, its usual method is to bring about the needed economic improvement largely through education. Even the compulsory laws have usually been preceded by much educational work.

All of this work toward standardiza-

tion of agricultural products is carried on by well-trained and experienced workers in the United States Department of Agriculture. The development of the standards for each commodity is in the hands of specialists who, in each case, have devoted years of intensive work to the study of the marketing of the commodity involved. The standards as drawn up by the specialists are tested experimentally by actual commercial use; and public hearings at which comments and criticisms can be offered are usually held before any standards are promulgated.

If laws are passed making the use of any of these standards mandatory in interstate or foreign commerce, the enforcement of these laws is usually entrusted to the Department of Agriculture with a feeling of confidence, on the part of Congress, that the Department will enforce them intelligently, sympathetically, and with more educational than punitive work.

It must not be supposed that Federal standards for farm products necessarily reflect the true market value of the product. There are several reasons why they may not. For instance, there are frequently certain factors which strongly influence market quality for which no practical method of measurement has been devised for use in commercial operations. Until comparatively recently the important factor of protein determination in wheat was ignored in commercial operations although it was given indirect recognition by paying a premium for wheat from sections where the average protein content was high.

Then, established trade practices have frequently associated the grades of which standards are composed with a limited number of factors. Thus cotton is graded chiefly on the basis of color and freedom from trash, whereas length of staple, equally important in trading, is dealt with separately. The complexities of grading have sometimes made it necessary to confine the grades of a standard to a single factor. The United States wool standards, for instance, are based wholly on diameter of fiber.

PRACTICAL ASPECTS

Let us turn to some of the practical aspects of the work resulting from grain standardization. It is recognized that the inspection and grading of grain is not a precise science, as there are several factors of grading the determination of which requires the exercise of human judgment. This presents the problem of correct and uniform application of the standards by all inspectors at all markets. To meet this, the Department has divided the country into supervision districts with an office of Federal grain supervision at the principal grain markets.

Milling and baking investigations are conducted in connection with the enforcement of the Grain Standards Act. Such investigations have been made of the various grades and classes of wheat marketed in commerce. The investigations yield information which should lead to the development and production of superior wheat. Other investigations relate to the influence of weed seeds, garlic and frost and heat-damaged kernels on the milling and baking value of wheat.

In the case of the work with livestock and meat, the standardization of which has been a very complicated problem, the resulting standard schedule is sufficiently elaborated to care for the trade as conducted on our largest and most highly organized markets; it is also so arranged that it serves the purpose of the smaller markets where demands are not so exacting and where less fine distinc-

tions are made. The use of this schedule makes the following things possible: (1) It enables the buyer to get the animals he needs without buying some for which he has no use; (2) it makes possible an accurate determination of values; (3) it enables the producer to sell his livestock strictly on its merits, and (4) by providing a name or label for each group and having the meaning of such group names clearly understood by all interested parties, it makes possible accurate and intelligible market reporting.

The United States Shipping Board, an increasing number of international and coastwise steamship lines, Federal and state institutions, hospitals of the Veterans Bureau, chain restaurants, and dealers are making their purchases of meats according to specifications based on the meat standards with marked savings and with general satisfaction as results.

Our standardization work on wool represents the results of much cooperation and is also an example of international work toward standardization. The United States standards for grades of wool and top, covering diameter of fiber only, have been promulgated after much coöperative study by the Department of Commerce and the Department of Agriculture, after thorough testing in tentative form, and after they were endorsed by the Research and Standardization Committee of the wool and textile industry, by wool producers, and the wool trade. They are compulsory for use in the grading of wool stored in warehouses operating under Government license, but are otherwise optional.

This joint committee further recommended that the departments interested consult with authorities of the British wool and textile industries to the end that a correlation of the United States standards for wool and the British classifications for wool could be effected, and a system of nomenclature worked out that would take cognizance of the wool imported into this country.

Through the coöperation of the Bradford Chamber of Commerce, of England, and representatives of the English textile industries, including spinners, manufactures, export merchants, and the British Wool Federation, the work of correlating the proposed United States official wool standards and average Bradford qualities was carried on by a committee composed of members of the British Wool Federation appointed by the Bradford Chamber of Commerce, in coöperation with the American committee. The English committee suggested that standard grades for top be established corresponding with the diameter of fiber in the wool standards. This suggestion met with the approval of the American committee. At the conclusion of the conference between the English and American committees, the Bradford Chamber of Commerce, acting for all of the allied wool textile associations in Great Britain, advised that the action of the British committee had been unanimously approved by the Chamber.

ESSENTIALS OF THE STANDARDS

In no two large groups of commodities can just the same factors be considered in formulating standards, or just the same methods be pursued, or just the same mode be used to place the standards in expression for practical application.

Cotton.—In the case of cotton, each practical form consists of a box made of heavy cloth-covered pasteboard in which are placed samples of twelve bales, all of the same grade. To this box is attached a hinged cover, on the

underside of which is mounted a photograph of the samples showing the size and position of the foreign matter originally present on the surface of the cotton and the quality of preparation. The photograph bears an imprint of the seal of the Department of Agriculture and a certificate of the Secretary of Agriculture dated and signed by him or by another official designated for the purpose. The twelve samples, which each box contains, not only show the range or variation of leaf color and preparation allowed within that grade, but represent regional differences as well. For convenience of reference, each sample is given a numbered position in the box. Official standards for staple have also been established and practical forms of the standards are available for certain of these lengths. These standards have now become universal standards for American-grown cotton.

There are also seven basic grades of cotton linters, ranging from the highest first cuts to the shortest second cuts. Each box representing a grade is made up of twelve samples. The gradation is based chiefly on the proportions of long fiber and fuzz with a slight increase in the quantity of foreign matter permitted. Each box as a whole shows the expectant variation both in the character of the fibers and in the quantity of foreign matter generally to be found in bales of linters turned out by carefully managed oil mills.

Grain.—Generally speaking, the factors which determine the commercial grade of grain are moisture content, weight per bushel, freedom from foreign material and other grains or other classes of the same grain, damaged kernels, in certain cases, color and texture of kernels, freedom from objectionable dirt and general condition, that is, whether the grain is cool and sweet or whether it is musty, sour, heating, or hot. These are the factors of prime importance for commercial trading purposes.

For standardization purposes grains are divided first into classes and subclasses. For example, wheat falls into five classes as follows: Hard Red Spring, Durum, Hard Red Winter, Soft Red Winter, and White wheat. In each class there are two or more subclasses.

The official grain grades are designated by number. For instance, there are five grades of wheat and a sample grade which is provided for off grade grain which is sold subject to inspection of the buyer. Special wheat grades are provided for mixed wheat, mixed durum, treated, garlicky, smutty and weevily wheat.

Official standards have also been established for shelled corn, oats, rye, grain sorghums, feed oats, mixed oats, barley, rough and milled rice.

Livestock.—Livestock are separated into various groups before actual grading by official standards is done. In this grouping *kind* refers to the species, as cattle, hogs, or sheep; *class* separates cattle, for example, into steers, heifers, cows, bulls, and stags; and *sub-class* provides for subdivisions based upon the relative desirability of the animal for certain rather general purposes as slaughter, feeder, or stocker.

These sub-classes based upon general use are not sufficiently accurate to cover all needs of the trade; therefore it is frequently necessary to provide additional subdivisions based on particular suitability for certain special uses. Thus, slaughter hogs are divided into butcher, bacon, and packing hogs. Further segregations are made on the basis of age and weight. Certain classes of consumers still require heavyweight cuts of meats, but there is a

rapid shifting of demand to lightweight cuts. Stockyard operatives sort animals to obtain cuts which will meet these requirements. Finally, the standardized grades for livestock are based on three basic factors—conformation, finish, and quality.

Wool.—The factors of importance in determining the value of wool for certain purposes are four: Diameter of fiber, length of fiber, spinning quality of fiber, and amount and character of shrinkage. Our present standards are based wholly on diameter of fiber. This is a basic factor, since there is a more or less consistent relation between fineness of wool and variations in certain other factors.

In the establishment of these standards the requirements of the producers and merchants of the United States are adequately provided for. Sets of seven official grades will be prepared and distributed, each of which can be used as a basis for grading entire fleeces of wool. Either numerical designations or the American nomenclature may be used for these seven standard grades.

Sets of twelve standard grades will be issued and each grade may be used as a basis for the necessary division of the qualities found within fleeces when wool is sorted for manufacture. The grade terms for the sorting grades are grouped and correspond with the grade terms for grading wool. The international character of this work has been outlined.

Hay.—Each group of hay in United States standards has its classes, grades, and definitions. In all United States hay standards the term "class" is used to describe the kind of hay or the mixtures of various kinds, and has no reference whatever to quality or condition. Class names, such as Timothy, Clover, Alfalfa, and Timothy Light, are as descriptive of the kinds and mixtures of hay as necessary terseness will permit. The first word in each class name usually indicates the kind of hay which predominates in that class. Succeeding words, if any, in the class names, indicate the kind of hay mixed with the predominating kind and whether the mixture is comparatively light or in an amount too great to be considered as a light mixture.

Each class of hay in the United States standards is based upon definite specifications for the mixtures permitted. The various classes of hay in United States standards have been designed to include all of the well-defined kinds and mixtures of hay that are of chief commercial importance in the United States.

In some of the hays, color is the most important grading factor; in others, the grading factors are leafiness, color, and foreign material, of which leafiness is the most important.

The numerical grades and sample grade define the quality and condition of the greater part of the hay crop of the United States. They have been designed to cover the bulk run of the good, fair, and poor quality hay in the trade. In United States standards the numerical grades are supplemented with special grades to describe and emphasize the unusual superior or inferior qualities of certain kinds of hay.

Beans.—For standardization purposes dry edible beans are divided into nineteen classes such as pea beans, red kidney beans, marrow beans, and medium white beans. Each class is divided into three numerical grades with the exception of Lima and Baby Lima beans, for which there are but two grades. Beans which do not meet the requirements of the standard grades are designated sample grade. The grade or quality of beans depends on their wholesomeness for food as evi-

denced by their general appearance, and degree of freedom from moisture and such defects as split beans, damaged beans, foreign material of any nature, and mixtures of other kinds or classes of beans.

A separate set of standards has been provided for soy beans which are divided into five classes. The grades are based upon variations in the following quality factors: Condition and general appearance, minimum test weight per bushel, moisture, split and damaged beans, and foreign material.

Broomcorn.—For the purpose of standardization broomcorn is first divided into four classes according to length. The standards contain seven grades and a sample grade for lots of low quality which do not meet the requirements of the standard grades. The grade of the bale is determined by the percentage of each quality of hurl and underwork in a representative sample. Hurl is long or overlength brush. The quality is determined by the color, fineness of fiber, and relative freedom from defects which lower the quality of the brush. Underwork includes all short or medium brush, and long and overlength brush, which do not meet the requirements of hurl. The same quality factors apply. The grade of broomcorn is determined on the basis of the lot free from damage.

Tobacco.—According to the official classification of the Department of Agriculture all American-grown tobaccos are divided into six classes. The first three are based on the method used in curing; the remaining three are based on the principal use for which the tobacco is grown. These classes are: Flue-Cured Types, Fire-Cured Types, Air-Cured Types, Cigar-Filler Types, Cigar-Binder Types, and Cigar-Wrapper Types.

There are several types of tobacco in each class. A type is defined as a division of one of the main classes the peculiar characteristics of which permit its being divided into a single system of grades. Grades have been prepared for all the leading types except Burley and tentative grades for Burley are in course of preparation.

Tobacco is graded on the basis of the following factors: (1) Group; (2) Quality; (3) Color; (4) Length. The last two factors are not always of sufficient commercial importance to be included in the grade. The six groups are: Wrappers, Heavy Leaf or Cutting Leaf, Thin Leaf or Cutters, Stemming Lugs, Granulating Lugs, and Priming Lugs. There are seven regular divisions of quality and an additional eighth quality in Leaf, a Scrap and Sample in Lugs, and a Damaged.

Fruits and Vegetables.—The terminology used in fruit and vegetable grading has been placed on a numerical basis with the exception of certain premium grades provided for products of exceptional quality which have been designated U. S. Fancy. The U. S. No. 1 grade is in all cases intended to include the major portion of the commodity which has customarily met the requirements of the best commercial grade.

In general, the factors considered in determining the grade are: (1) Variety; (2) market quality based on the state of maturity, general appearance including desirability of shape and color and relative freedom from such defects as cause waste or unreasonable deterioration; (3) size.

In trading in these products it is necessary for buyers and sellers to specify either the specific variety as "Winesap apples" or the type as "Round white potatoes." In some grades the minimum size of the product is specified, but where this is not the case the specifications must also be

in addition to grade as "Winesap" apples U. S. No. 1, 2½ in. min. As fruits and vegetables are graded, packed, and branded, at point of shipment, and as subsequent deterioration is inevitable, such factors as overripeness occurring in storage or in transit are considered as affecting the condition rather than the grade.

Federal standards have been developed for thirty-four fresh fruits and vegetables. In some instances more than one set of standards have been developed for a commodity. In the case of onions, for instance, separate standards have been established for Bermuda onions, for Creole onions, and for northern-grown onions. Such subdivisions of the work bring the number of sets of standards for fruits and vegetables up to forty-four.

Fruits and vegetables for canning purposes present special problems, but these are being cared for, and progress is being made in standardization work relating to peanuts, honey, and eggs. The work toward standardizing the containers used for shipping fruits and vegetables in interstate commerce was among the Department's first highly successful standardization work and was supported both by law and by popular opinion, but further standardization work on containers is yet to be done.

The standardization work of the U. S. Department of Agriculture has proved to be one of its most interesting and satisfactory lines of economic endeavor during the past two decades when judged by progress made, benefits derived, and endorsement by the public. We have completed the fundamentals of the work, and although each commodity has its peculiarities and its problems, we have mastered so many of them that we feel confident we can ultimately formulate standards for all of the factors of all of the commodities.

Standardization in the Household

By Alice L. Edwards
Executive Secretary, American Home Economics Association

In industry, where the materials used are measured by almost appalling figures, where employees run into the thousands and the plant covers acres, it is easy to demonstrate the wisdom of buying by specification and of standardizing both the processes of manufacture and the product. Convenience and economy are alike served, and competition often compels it.

Conditions in the individual household are very different. Here we have small, more or less isolated units, not engaged in business competition, and often so strongly influenced by family custom that the attempt to introduce a change is met with the apparently unanswerable argument "It isn't done that way in our family."

It is true that habits and routine in individual homes have often developed to the point where they could almost be called standardized practices. So much variation is found, however, between practices in such otherwise similar homes that they cannot be said to conform to any but their own individual standards. Moreover, even those individual standards are less fixed than formerly. Everyone realizes that many processes formerly carried on in the home have passed or are passing out of it. Weaving, for example, has gone entirely into the factory, while such activities as breadmaking, food preservation, laundering, and dressmaking are wholly removed from some homes and only partially retained by others. The old routine is further upset by the fact that families tend to move more frequently from one residence to another and to spend much less time in the house than formerly. The most outstanding change, however, is due to the development of the myriad of appliances, equipment, materials, and public services which are now available in cities and towns and which make living a very different experience from that of our ancestors. In this new world of household conditions the value of standardization is inevitably making itself felt.

The Homemaker's Interest

The attitude of the homemaker toward simplification and standardization is naturally different from that of industry. She is not primarily concerned in the processes of manufacture or in the specific materials going into a piece of equipment or fabric. What she is much concerned about is the performance and use value and, to varying degrees, the esthetic qualities of the article in question. She is much more interested, for example, in the wearing quality of sheeting than in the length of the cotton fiber or the twist of the thread from which it is made, although she knows that these have a relationship to wearing value; how much she cares to spend for fineness and smoothness of texture is a matter of individual taste and purse. Articles of household use represent such a multiplicity of manufacturing processes and raw materials that the housewife must concede her inability to familiarize herself with all of them. She is willing to leave these technical matters to the manufacturer, providing only that she be helped to answer such questions as how it will wear, what kind and how much service a thing will give her, what will be the operating cost.

POINTS OF ENTRANCE

Trained, observant homemakers who have been watching the development of efficiency engineering and standardization in business and industry and considering their value in solving some of the problems in the home find that standardization is entering or may enter the home in various ways. It may influence the house itself, its plan, the building materials, and methods of construction; the equipment and furnishing; the family clothing; the food; the household processes.

UNIFORMITY IN HOUSING

In comparing the houses of a century or more ago with those of today, the tendency toward standardization is conspicuous. The detached house gives greatest opportunity for individuality, but even here cost is a factor which encourages standardization. How far this may be carried is seen in the ready-cut houses which are shipped direct to the purchaser with all parts ready to fit together and all necessary supplies included, even to hardware, paint, and plumbing. It is worth noting, however, that in spite of this standardization of parts the catalog of one make of such houses advertises ten separate models with possible variations in floor arrangements which bring the total number of plans for which they are applicable to thirty-five. Still more significant is the standardization shown in the realty developments with block after block of practically identical houses. Even where the owner builds for himself he often sacrifices individuality to economy by using ready-made plans. The work of the Small House Service Bureau, affiliated with the American Institute of Architects, is noteworthy in this connection because its designs allow for standardization and economy of materials and construction while they furnish variety of plan and permit individuality of detail. It is in the apartment house, however, that uniformity in housing seems to be reaching its climax. When one sees not only tier after tier of similar apartments in one huge house, but row after row of exactly similar apartment houses, one can hardly question the reality of standardization in the household.

STANDARDIZATION OF HOUSEHOLD EQUIPMENT

Other allies of standardization in house plans and construction are the housing and sanitary codes which in many cities predetermine certain minor features. Even more general is the influence of the standardization followed by manufacturers of such articles as window and door frames and materials for electric and plumbing installations. The simplification and standardization which has been adopted in electric light sockets, light bulbs, switches and plugs is both a convenience and economy, and the standardizing of attachments for electrical apparatus is encouraging the more extensive use of electrical equipment. The standardization of electric motor frames in which the American Engineering Standards Committee and the National Joint Electrical Manufacturers are taking the lead will be of interest to those using electric power in their homes. It is encouraging to learn that standards and specifications are being developed to simplify the matching of faucets, bath-tub fittings, and other plumbing devices.

Although there are perhaps fewer examples of standardization in household equipment than might be expected when one considers what is happening in industry we find considerable development wherever distributors or consumers have brought their influence to bear. The American

Gas Association is adopting standard specifications designed to represent good practice in gas appliances with the result that a consumer buying a gas range with the label of the Association is now assured that it will be safe and reasonably efficient. Devices greatly appreciated by the housewife are the heat regulators for gas ovens and the thermostats for the control of room temperatures.

Under the auspices of the Division of Simplified Practice of the United States Department of Commerce committees representing manufacturers of refrigerators and the ice industries are considering simplification both in the sizes and shapes of ice cakes and in certain parts and dimensions of refrigerators, while conferences called by the American Engineering Standards Committee at the request of the American Home Economics Association and the American Institute of Architects look forward to the establishment of specifications for the performance to be expected of such equipment. Closely related to these attempts are the investigations which the Bureau of Home Economics of the United States Department of Agriculture is carrying on with domestic refrigerators, including their performance and cost of operation.

Through conferences held under the auspices of the Division of Simplified Practice of the United States Department of Commerce recommendations have been adopted reducing to only a few sizes each, bedsteads, springs, mattresses, blankets, and pillows. This may work a temporary inconvenience to the fastidious housekeeper who can, for example, no longer buy some favorite but unusual size of blanket but she will soon realize that what the store offers will meet all practical needs and if she should discover that her new blankets cost a little less she certainly would be quickly reconciled to the change.

Standardization of Clothing

Although few of us desire to have our clothing standardized to the point where we go about in uniform, most of us would welcome standardization in sizes, measurements, and certain methods of construction and are glad to know that a start has been made along this line. The Association of Knit Underwear Manufacturers has standardized methods of laundering to prevent undue shrinkage. The National Association of Hosiery and Underwear Manufacturers have standardized their methods of measurements of sizes. The International Association of Garment Manufacturers have effected the standardization of dimensions of their products, mainly outside garments. An interesting illustration of standardization in garment construction appears in the resolutions recently adopted by the Fur Retailers of America which call upon members to follow certain specifications in the construction of fur garments.

As regards standardization of the wardrobe, almost every amateur social philosopher has pointed out that women are far behind men. Without going into the intricacies of social conventions and feminine versus masculine psychology, it is only fair to say that under present conditions a woman finds it by no means easy to standardize her wardrobe. Many a busy woman who has hoped to save time and mental effort by sticking at least to the same types of underwear, shoes and gloves will testify to the discouraging frequency of the reply "We do not carry that any longer, Madam."

Food Products

The value of grading and standardization has been made clear to the

producers of food products through coöperative marketing. This has been strikingly illustrated in the case of the citrus fruits and apples from the west. Government supervision and control during the World War also demonstrated the value of grading and standardization so that government standards have been developed for such products as fruits, vegetables, peanuts, honey, butter, cheese, eggs, and meat, and inspection of certain foods has been inaugurated in important distributing centers. Although these standards are for the wholesale trade they materially influence the character, quality, and often the pack of the food which comes into the house. In the retail markets of two or three cities meat has recently begun to appear with the government inspector's stamp showing on every cut.

The Pure Food and Drug Act of 1906 not only checked misbranding and adulteration of food and insured for the home a safer, more healthful food supply, but it has led to the establishment of legal definitions or descriptions which are in effect standards for certain qualities. The states have largely based their food and drug laws on this federal act, establishing for themselves more specific standards. Another very valuable government service has been the standardizing of the various containers for marketing fruits and vegetables, eliminating false measures and deceptive shapes. The standardization of milk bottles and caps has had the further advantage of making them more sanitary. The requirement that the net weight of contents shall be stated on the outside of the package furnishes a standard for judging the relation between price and quantity. For cost comparisons to be easily made, it would be well to limit and simplify the number of net weights of packages in which materials of different types may be marketed; few of us, for example, will take time to calculate the relative cost of an ounce of chocolate from a $3\frac{3}{4}$ ounce package @ 10 cents and a $5\frac{1}{8}$ ounce package @ 15 cents.

That standardization of certain types of commodities falls in with housekeepers' purchasing habits was brought out in a recent study of consumer demands for apples in New York City. There it was found that the consumer was distrustful of an unstandardized pack and that her choice was largely influenced by such factors as uniformity, appearance, and familiarity. Although there were more than one hundred varieties on the market, only fifteen were mentioned as preferred for eating raw and five for cooking, and the report adds, "This would tend to show that variety standardization is beginning to manifest itself very strongly in the marketing scheme and that the number of varieties of commercial significance are narrowing down to a relative few."

Apparently with a product such as apples, where there are frequent purchases and where the housekeeper can judge readily of the satisfactoriness of the product, she does not seek wide variety once she has found the apple which meets her needs, but buys that over and over again so long as it is on the market. On the other hand, in the case of manufactured products where standardization has not been established, where quality and value are not readily determined, or where purchases are infrequent, she probably gives less attention to replacing an article by one of the same kind. This may often be due to the fact that she is distrustful of her previous choice and hopes that another kind may prove superior.

Since more and more goods are being sold under trade-marks and brand names, it is of especial importance to the housewife that correct standards

should be established for such goods and that the labels and advertising give specific information as to quality and performance value instead of the general high-sounding phrases which convey no real information. On her canned vegetables, for example, she would welcome more understandable terms than fine, superfine, and extra fine. At present many wholesalers and retailers have their own set of trade names to designate the grades of their own goods, which often only the initiated understand. Standardization in such terminology would be of inestimable value to the housewife who cannot hope to ferret out the significance of the present names of all the products offered for her choice.

Another reason why the housewife is so concerned in the standardization of household goods and equipment is that she has found it impossible to standardize her own work and products without this service. This is perhaps best illustrated in cooking, for standardization in cooking depends upon standardized equipment and reasonably standardized food materials. She has been the subject of many a laughing gibe because of the vague terms used in recipes as, "cook to the soft ball stage," "season to taste," and "bake in a medium oven." Upon investigation it becomes evident that she has had to work with very inexact equipment and with widely variable materials. How can we expect to standardize a product when the materials used in it vary widely from time to time in their composition, flavor, and texture, when utensils are unstandardized, and above all when means for controlling temperature in cooking are inadequate? The research experts will recognize in these variables enough to discourage the most persistent.

It would seem a simple matter to secure a reasonably accurate half-pint measuring cup, but the story of the attempts to accomplish that is long and not ended; most housekeepers would be surprised at the results of comparing the capacities of the cups on the market, yet there is much less variation now than formerly. The oven, deep fat, and candy thermometers, although not any too accurate, are aiding in the removal of guesswork and the development of standardization of procedure and results in a number of cooking processes. But of all equipment contributing to working efficiency and accurate results in cooking, none is so important as a stove which will furnish easily controlled and reliable heat.

Influence of Standardization on Price

The influence of standardization on price is of course one which closely concerns the ultimate consumer. He recognizes that the adoption of simplification should lower costs of production and distribution and he trusts that a due proportion of this saving will ultimately affect the price he pays. As regards standardization according to quality or performance, the case is not entirely simple. Some manufacturers have objected to standardization of certain household equipment because they believe that it will "step up the manufacturing program" to a very high quality product, and that the housekeeper will not be willing to pay the necessarily increased price for the better article. The housekeeper, on the other hand, is becoming more insistent that she be given the facts as to the performance ability or quality of the various articles from which she has to choose, so that she can decide for herself whether it is wiser to pay the extra money required for the higher grade or make a smaller investment in an article of a lower standard. She has learned from experience that in many

lines price is not a reliable guide to quality, especially not in goods whose real value is difficult to judge. In such cases the intelligent housewife realizes that her hope lies in the devising of some means by which she is guaranteed the necessary information, and she is coming more and more to believe that she is justified in demanding this.

PROGRESS IN EUROPEAN COUNTRIES

In various European countries consumer interest and activity in efficiency and standardization in the home seems to be more marked than in this country, probably because of the greater economic stress. Of interest in this connection is the fact that at the last International Congress of Scientific Management a resolution was passed to organize a section on household efficiency for the Congress to be held in 1930. Prominent in this movement were delegates from Czechoslovakia. At the Fourth International Congress of Home Economics held in Rome in November, 1927, the resolutions adopted included one calling for the study of "simplification" and "rationalization" of all phases of household work and its introduction into all schools of household management.

The Deutscher Normenausschuss, the German equivalent of the American Engineering Standards Committee, lists a variety of household commodities among the articles whose production has been standardized and is in active coöperation with such organizations of household consumers as the Reichsverband Deutscher Hausfrauenvereine and the Reichsverband Landwirtschaftlicher Hausfrauenvereine, national federations of the German organizations of housekeepers. The Austrian Society for Technique in the Household (Österreichischen Gesellschaft für Technik im Haushalt) maintains a testing bureau and publishes a semi-monthly bulletin with reports on equipment which has passed its tests. German interest in the subject is shown by the fact that what is apparently the first book in which the detailed design of ordinary household articles, such as water-bottles, knives, and forks, is discussed from an engineering point of view, is "Der Neue Haushalt" by Dr. Erna Meyer.

An excellent example of consumer demand bringing standardization into the home is found in Norway where in 1925 the National Council of Women asked the Department of Agriculture to aid them in securing reliable information concerning electrical equipment. Durability, insulation, evenness of heat distribution, consumption of electricity and actual suitability of the electrical ovens at that time on the market in Norway, were studied. No grading was done, but the results of the experiments were published in the report so the customer had facts upon which to base decision when making a purchase. It was reported that one make of oven which was found to be decidedly superior was the one least advertised and accordingly least known. The influence of such tests on manufacturers was shown by the action of an important firm, which, when it heard that its oven could not be heated to the temperature required for searing beef, asked to be allowed to substitute an improved type, agreeing to withdraw the unsatisfactory one from the market.

PROGRESS IN UNITED STATES

In this country the legitimate interest of the consumer has begun to be recognized. It has brought about the study of household refrigerators inaugurated by the Bureau of Home Economics and carried on in coöperation with the Society for Electrical Development and the National Association of Ice Industries. As already pointed out, it was the consumer's de-

mand, represented by the American Home Economics Association, which resulted in the meetings called recently by the American Engineering Standards Committee to consider the establishment of specifications for refrigerators, which would take into account refrigerating efficiency. The Association has also made articulate the need of the consumer for standardized sheeting and led in another series of meetings called by the American Engineering Standards Committee for the establishment of standards for sheeting in which the major emphasis is being placed on measurable characteristics and performance of the finished product. Furthermore the Association is actively interested in various phases of the simplification sponsored by the Division of Simplified Practice of the United States Department of Commerce.

Among the official agencies which are contributing to efficiency and standardization in the home, the Bureau of Home Economics in the United States Department of Agriculture, is in an exceptionally good position to interpret the needs and desires of the consumer and hence to give very valuable information to the many inquiring manufacturers, which may result in the production of more satisfactory goods; it can also pass on to the housewife in intelligible language the available technical information about household goods. Unfortunately the fact that trade names cannot be given out by a government agency in such cases lessens the assistance which the household buyer can obtain through this bureau.

To thoughtful consumers a discouraging and at the same time a hopeful feature of the situation is that there already exists, but unavailable to the public, much useful information for standardizing his selection of household commodities. They realize that government standards and specifications are already rendering significant aid to industry and large consumers, and they are beginning to ask that as far as circumstances allow this be put in form useful to the ultimate consumer as well. A few periodicals and advertising agencies maintain laboratories for testing goods whose advertisements they carry, and part of the information thus obtained is given to the readers, but by no means all. A vast amount of information is buried in files of the many testing laboratories connected with industrial plants. The report has come of a decision by the Retail Dry Goods Association to establish a testing laboratory which will prove significant news for the consumer if some of the standards there determined can be placed at the service of the patrons of the retailers. An interesting enterprise in this connection is the Consumers Club recently organized with headquarters at 2 West 43d Street, New York City; technical information regarding specific articles is compiled for the confidential use of members, who in return, report on what their experience shows regarding the correctness of the information supplied.

From all this it appears that standardization of some sort seems to offer to the housewife some hope of rescue from the maze in which she finds herself when she attempts to make wise purchases for her family. It remains to be seen whether assistance will come through the efforts of the manufacturer, distributor, retailer, or consumer, but should economic pressure increase it is reasonable to expect that the retailer and consumer, or even the consumer alone, will demand and obtain needed specifications and standards for the more important household goods.

Standardization and Waste Elimination

By William J. Quinn, Jr.
Chairman, Committee on Standardization and Waste Elimination, American Hotel Association

ONE of the few things we have to be thankful to the World War for is the present demand for Standardization and Waste Elimination: it must be remembered, however, that the writer is referring in this article only to hotels. The subject of standardization first came into prominence when it became imperative to use manufactories for supplying the necessities of war, when men, time, space and material were at a premium. As far back as December, 1921, Secretary Hoover established the "Division of Simplified Practice," which was designed to serve as a centralizing agency in bringing producers, distributors and users together, and to support the recommendations of these interests. From that point on the subject has gained momentum and is being intelligently delved into by many and various industries. It is safe to say that the hotel industry was one of the last to treat the subject in a serious manner.

Division of Simplified Practice

The "Division of Simplified Practice" has included in its work the standardization of many types of tinware, china, glassware, paper, beds and bedding, etc., used by hotels, and which standardization, while not applicable to hotel use in all cases, has aided our industry to a great extent. The Department in Washington cannot consider any one business in its negotiations, and has to include hospitals and institutions of all kinds. What might be acceptable in the way of standardization to hospitals and institutions would not be of use to hotels, and what a hotel of one class could use might be impossible for a hotel of another class to even consider. A hotel on Park Avenue in New York and a modern hotel on any "Main Street" are both first class in their respective communities, but could they both use the same standards of carpets, table linen, bed linen, etc.? No, and that is what makes the problem so difficult. As a matter of fact, it would seem that hotels will profit more by creating standards of their own in the selection of types and designs of the merchandise they use before taking up the subject of standardization at the source of manufacture.

Standardization of Kitchen Utensils

The modern hotel, using, as it does, almost every kind of merchandise manufactured, has before it a tremendous task to standardize what it buys and uses, and it would be an absolute impossibility to make any headway unless the manufacturers and jobbers handling the various kinds of merchandise are willing to create standards at their source. As an illustration: all hotels use roast pans in their kitchens, ranging in size from about 12 to 28 inches in length. There are many sizes between these two limits that could easily be dispensed with once the subject was given sufficient thought by the hotels' executives, which, of course, includes its chefs and others directly implicated in the use of such pans. In order to reduce the number of sizes of roast pans, it first becomes necessary to circularize the hotels throughout the

country with questionnaires, which questionnaires, when returned to a central point, have to be assorted with a view to securing a majority of opinions on particular sizes of pans. When this long drawn-out part of the work has been finished, it then becomes necessary to go to the manufacturer and discuss the subject with him. If he is one whose business is to supply hotels, he will see the importance of the request and go about the task of changing his machinery and dies so as to make only the sizes the hotels find it necessary to use. After the manufacturer, the jobber must be consulted, and so on to the ultimate user of the pans. When roast pans are mentioned, only one kitchen item has been considered, and when you know that there are upwards of 1200 different articles used in a modern hotel kitchen, nearly all of which will stand an effort at standardization, you will readily see that the problem has many ramifications.

FURNITURE OR ROOM EQUIPMENT

In leaving the kitchen of a hotel, we have the other departments to consider, and we can then take up the subject of furniture or room equipment. Every one knows what the room equipment of an ordinary hotel bedroom is, and when you begin to try to standardize each article of that equipment you have almost a life's work before you. However, the many angles connected with the subject only show its importance, and if in the ordinary course of events a half dozen items could be standardized in a year, then many millions of dollars will have been saved.

RESULTS OF STANDARDIZATION

To show what can be done by standardizing, the following fact may prove interesting: a large chain hotel in New York simplified its requirements and reduced the cost of items simplified 20 per cent below former cost, thereby releasing $350,000 from former inventories, and showed a saving of $100,000 per year. This was not the result of standardizing articles in manufacture, but was accomplished by reducing thirty styles of glassware to ten; fifteen designs of carpet to three; many patterns of table linen to one, and simplifying generally about two hundred other items. The foregoing is what was meant when it was stated earlier in this article that hotels might profit more by creating standards of their own in the selection of types and designs of merchandise, rather than concern themselves at present with standardization in manufacture.

Some years ago, the manufacturers were turning out over 175 types of lamp bases, which made it necessary to purchase a lamp that would fit the socket already installed. Through the simplification brought about the manufacturers are now turning out only six standard bases. There were also manufactured about three dozen different varieties of attachment plugs which were not interchangeable: through simplification the standard plug with the parallel blades resulted, the usefulness of which speaks for itself. Almost every kind of appliance on sale today is equipped with this standard plug. The result of these two simplifications is outstanding.

The work of the "Division of Simplified Practice" in Washington has been far reaching, and anyone interested in what has been done by the Department so far can secure booklets or pamphlets on the various subjects by applying to the "Division of Simplified Practice," Department of Commerce, Washington, and all who have any interest whatever in the subject will do well to learn the results of the Department's efforts.

Simplification and Standardization of Hospital Supplies

By Margaret Rogers
Chairman, Committee, Simplification and Standardization, American Hospital Association

As a result of what had been accomplished in other lines of industry, the American Hospital Association, some five years ago, became interested in the work of simplification and standardization of commodities purchased by hospitals. This work was carried on with the active coöperation and advice of the Division of Simplified Practice of the United States Department of Commerce.

Progress During World War

During the World War it was one of the major functions of the Conservation Division of the War Industry Board to concentrate its efforts for the release of the largest amount of labor, capital, materials and equipment for war purposes under the motto, "Maximum production at minimum expenditure." Simplification and standardization, therefore, in its broadest sense, played an important part in this war-time program, although its principles had been recognized before that time. These principles were applied with vigor by the Federal agencies in buying, manufacturing and selling with enormous saving of material, labor and capital.

Post-War Application

Many business organizations, after the war, decided to apply the same principles of simplification and standardization to normal peace conditions to test its value as a management policy. While progress was made by many concerns in this direction during the period of depression and reconstruction, 1919–1921, little impetus was given to the movement. It was during this period that the Federated American Engineering Society, of which Mr. Hoover was President, began making a study of six of the largest industries, namely: metal trades, boots and shoes, textiles, building, printing and men's ready made clothing. Late in 1921 the report of this survey was published under the title of "Waste in Industry." This report brought out the fact that in these six industries alone there existed a preventable waste of from 29 to 64 per cent and that ten billion dollars could be saved annually through simplification and standardization. The war experience followed by this report proved conclusively the urgent necessity of utilizing standardization in the elimination of unnecessary varieties and the concentration upon the manufacture and distribution of the articles of greatest interchangeability. Mr. Hoover, who had then become Secretary of Commerce, established the Division of Simplified Practice as one of the units in the general program of the Department of Commerce to eliminate industrial and commercial waste and as a fundamental means of promoting better business. The Division's activities are purely coöperative in character. The initiative must come from the business or industry. Its chief function is to serve as a centralizing agency in bringing together manufacturers, distributors and consumers of the specific commodities and to support the recommendations that they may mutually agree upon which will be of benefit to the industry and the public concerned. The Division of Simplified Practice works also in conjunction with the United States

Chamber of Commerce and the American Engineering Standards Committee. In the light of this information, the American Hospital Association felt that some of the same principles could be successfully applied to the hospital field. With the advice and coöperation of the Division of Simplified Practice, the Association decided to make a study of hospital beds, which might become a basis for developing similar investigations in other commodities.

STANDARDIZATION OF HOSPITAL BEDS

As a first undertaking, the Association, through its Committee on Simplification and Standardization, made a survey of the hospital field to determine the sizes and types of beds in use. A questionnaire was prepared requesting definite information as to the height, width, length, type and use, whether for private rooms or wards, also the number of beds, and information as to how many beds had been purchased during the previous three years. Definite instructions were given as to measurements. A similar questionnaire was prepared for the manufacturers requesting information as to the number of beds sold, sizes and types that were increasing in popularity, and what sizes and types could be eliminated with advantage. These questionnaires, together with a letter stating the object of the survey, were sent under date of July 12, 1923, to some 1100 hospitals in the United States and to ten manufacturers of hospital beds. The questionnaire did not enlist much interest at first. It was necessary to send out a second questionnaire before a sufficient number of replies were received. These replies were tabulated and analyzed, which showed the following results:

Total number of beds reported, 92,167.

Variety in lengths—33, as follows: 60, 64, 65, 68, 70, 70¼, 70½, 71, 72, 72½, 73, 73½, 73¾, 74, 74½, 75, 75½, 76, 76½, 77, 77½, 78, 78½, 79, 79½, 79¾, 80, 81, 82, 83, 84, 86, 90 inches.

REPORTED LENGTHS (in order of relative importance)

	Per Cent		Per Cent
72, 72½	27.5	73, 73½, 73¾	3.4
75, 75½	16.0	60 to 71 inclusive	1.0
74, 74½	14.5	80	.8
78, 78½	12.3	82 to 90 inclusive	.8
76, 76½	11.3	81	.6
77, 77½	11.2	79, 79½, 79¾	.5

PURCHASES

Length	Up to 1920 Inclusive	Since 1920	Change in Popularity
	Per Cent	Per Cent	
72	31.8	22.6	28 per cent decrease
74	16.6	6.8	69 per cent decrease
75	14.9	15.1	1 per cent increase
76	14.7	14.4	2 per cent decrease
77	.7	2.1	200 per cent increase
78	12.8	27.1	112 per cent increase

According to the preceding table, there was a decided tendency toward a longer bed than the 72-inch size, which was most popular previously. This trend was also noticeable in the 74-inch bed, and as the figures for the 75-inch beds showed little change, it seemed that the 78-inch size was coming rapidly into favor. The Federal Specifications Board had already adopted the 78-inch length, or inside distance between head and foot posts, as standard for all United States Government hospitals.

Variations in widths—34, as follows: 24, 27, 29, 29½, 30, 30½, 31, 31½, 32, 32½, 33, 33½, 34, 34½, 35, 35½, 36, 36½, 37, 37½, 38, 39, 39½, 40, 41, 41½, 42, 42½, 43, 44, 45, 46, 48, 54 inches.

ard, and that any other widths should be looked upon as special to meet special conditions. The 36-inch width of end angles of the spring has been adopted by the Federal Specifications Board for use in all United States Government hospitals.

Variations in height—44, as follows: 12½, 13, 13½, 14, 15, 16, 17, 18, 18½, 19, 19½, 20, 20½, 21, 22, 22¼, 22½, 22¾, 23, 23½, 24, 24½, 25, 25½, 25¾, 26, 26½, 27, 27½, 27¾, 28, 28½, 29, 29½, 30, 30½, 31, 31½, 32, 33, 34, 35, 36, 40 inches.

The height of 30 inches from floor to spring fabric, inclusive of wood shoes, adopted by the Federal Specifications Board as standard for all United States Government hospitals, was con-

REPORTED WIDTHS (in order of relative importance)

	Per Cent		Per Cent
36, 36½	66.3	34, 34½	1.1
29½, 30, 30½	16.6	38, 38½	.5
31, 31½	5.7	43 to 54, inclusive	.5
42, 42½	2.7	41, 41½	.3
39, 39½	2.3	40	.3
37, 37½	1.8	32	.2
35, 35½	1.4	24 to 29 inclusive	.2
		33, 33½	.1

PURCHASES

Width	Up to 1920 Inclusive	Since 1920	Change in Popularity
	Per Cent	Per Cent	
30	5.1	0.7	86 per cent decrease
31, 33	5.1	1.6	68 per cent decrease
36	69.4	82.7	19 per cent increase
39	3.4	6.8	100 per cent increase
42	5.0	3.4	32 per cent decrease

As regards the width, the 36-inch bed was by far the most popular, representing considerably over 50 per cent of the beds either before or since 1920. For this reason it was believed that this width could be made standsidered too high, and the 27-inch height was recommended as the standard height for general hospital use, believing that this height was more convenient for the majority of nurses. However, since rubber-tired casters

REPORTED HEIGHTS (in order of relative importance)

	Per Cent		Per Cent
24, 24½	33.0	18, 18½	3.3
26, 26½	12.7	22, 22¼, 22½, 22¾	2.9
29, 29½	10.2	30, 30½	2.0
27, 27½, 27¾	8.7	19, 19½	1.4
25, 25½, 25¾	7.1	32, 33, 34, 35, 36, 40	1.3
28, 28½	6.4	12½, 13, 13½, 14, 15, 16, 17	.9
20, 20½	5.1	31, 31½	.5
23, 23½	4.1	21	.4

PURCHASES

Height	Up to 1920 Inclusive	Since 1920	Change in Popularity
	Per Cent	Per Cent	
18, 21	8.4	4.8	43 per cent decrease
22, 23	5.5	9.6	75 per cent increase
24	20.2	10.8	46 per cent decrease
25	8.7	5.2	40 per cent decrease
26	21.9	22.7	4 per cent increase
27	13.7	20.8	52 per cent increase
28	11.1	11.7	5 per cent increase
29	3.4	.4	88 per cent decrease
30	2.1	8.4	320 per cent increase

and extension stems were widely used, permitting adjustment of height to suit the individual, agreement on a common height was not considered necessary at this time.

RESULTS OF SURVEY

The report of this survey was submitted to the Division of Simplified Practice with the request that a conference be held with manufacturers, jobbers, national hospital associations, state and sectional hospital associations and other users of hospital beds. Such a conference was called by the Department of Commerce at which the representatives from the various groups named considered the specific recommendations as above outlined. As an outcome of this conference, a 78-inch length, 36-inch width, and 27-inch height were adopted for recommendation as standard dimensions for adult hospital bed. These recommendations were submitted to the hospitals and to manufacturers, and were approved. In accordance with a unanimous action of the conference, the United States Department of Commerce, through its Bureau of Standards, recommended that simplified sizes and varieties of hospital beds be established as follows:

1. For general hospital use:

	Inches
(a) Length, inside distance between head and foot parts	78
(b) Width of end angles of springs	36
(c) Height from floor to top of springs, inclusive of casters, etc.	27

2. For certain institutional use the need for a narrower bed is recognized. In these cases the recommended width

is 33 inches, with dimensions the same as (a) and (c) in (1) above.

3. For private-room use, where a wider than standard bed is desired, the recommended width is 39 inches, with dimensions the same as (a) and (c) in (1) above.

These recommendations were approved by the Director of the Bureau of Standards and the Honorable Herbert Hoover, Secretary of Commerce, and became effective January 1, 1925, subject to regular annual resurvey and revision if necessary. (Simplified Practice Recommendation No. 24—Hospital Beds.) This eliminated 97 per cent of lengths, 91 per cent of widths, and 97½ per cent of heights and permitted interchangeability, economy and flexibility of service, and replacement in linens and mattresses as well as beds.

Before leaving the subject of hospital beds it might be well to state here that a resurvey of the hospital field was made a year and a half after these standard sizes had been adopted, inasmuch as the formulation of standards for use is a less important part of the procedure and the adoption and adherence is most vital to the success of any simplified program. This was done in the usual way by questionnaires to the hospitals and manufacturers. The replies to the questionnaires were received so promptly that they were tabulated, analyzed and completed in less than three months. This indicated a growing interest in the work of simplification and standardization by the hospital people. The result of this study indicated that there was 70 per cent adherence to the sizes adopted, and it was, therefore, felt unnecessary to make any changes at that time.

BED BLANKETS

The standardization of bed blankets had already been accomplished by the manufacturers of cotton, wool and cotton and wool-mixed blankets. The American Hospital Association coöperated in this work, and the Chairman of the Simplification Committee attended the meeting at which the number of sizes were reduced from 78 to 12, or an elimination of 85 per cent. Their recommendations were accepted by the American Hospital Association. (Simplified Practice Recommendation No. 11—Bed Blankets.)

HOSPITAL CHINAWARE

In the later part of the year 1924 and the year 1925 hospital chinaware was made the subject of study. This work was considerably simplified on account of what had already been accomplished by the American Hotel Association which, in coöperation with the American Vitrified China Manufacturing Association, had reduced the number of sizes of hotel chinaware from 700 to 192. The study was made in the same manner as with beds by questionnaires. In preparing the questionnaires we took advantage of what had already been done by the Hotel Association, eliminating a number of items on their list that did not particularly apply to the hospitals. The replies were analyzed and the result showed that 38 per cent of the hospitals accepted the original list as sent out, while 58 per cent indicated preference. The fact that 48 hospitals reporting, limited their requirements to 17 items was most significant. This report was submitted to the Department of Commerce. A conference was held with representatives from the pottery industries and other interested groups, at which a list of 115 items were adopted. These sizes were to be made in three weights as covered by the trade names, *rolled edge*, *medium weight* and *light weight*. These recommendations were accepted by the hospitals and manufacturers and became

effective July 1, 1925. (Simplified Practice Recommendation No. 40.)

That fewer items were necessary for hospital service was verified by representatives from two of the largest manufacturers of chinaware present at the conference, who stated that 78 per cent of their sales were concentrated on 42 items. These items are carried in stock and manufactured in four different patterns, and can be purchased at from 10 to 15 per cent less than the regular price. This means that if the hospital requirements could be supplied in these 42 items, the result would be reduced prices, smaller inventories, and no delay in filling orders. This list has been found ample for the requirements of many hospitals.

HOSPITAL AND INSTITUTIONAL TEXTILES

These were next made the subject of study, and it was done in the usual way, by questionnaire, the hospitals having become so much interested in the simplification and standardization program by this time that the questionnaires were returned promptly with the required information. The study indicated a large variety of sizes of the various commodities in use. A meeting was held with the manufacturers of cotton textiles and distributors, as well as representatives from the Hotel Association, Young Men's Christian Association, Young Women's Christian Association, Federation of Women's Clubs, and representatives from the various Government departments.

The following tables give the sizes found in use as well as the sizes recommended. These sizes have been submitted to the hospitals as well as other interested groups and were approved, and the schedule of sizes became effective October 1, 1927. (Simplified Practice Recommendation No. 74—Hospital and Institutional Textiles.)

PLUMBING FIXTURES

At the present time a study is being made of hospital plumbing fixtures. The manufacturers and distributors have coöperated with the American Hospital Association and the Department of Commerce in this study. The findings of this survey are ready to be presented to the hospitals. A similar study is being made by the manufacturers of surgical supplies, which includes gauze, crinoline, bandages, adhesive, etc., and it is hoped that the findings of these investigations will aid in the development of economies, improved methods and better materials.

STANDARDIZATION IN GERMANY

In connection with this it may be of interest to note that Germany made a comprehensive report of standardization work on bed linen, body linen and clothing used in hospitals as published in the Zeitschrift fuer das gesamte Krankenhauswesn, October 24, 1927, under "The Fachnormenausschuss Krankenhaus." (Committee on Branch Standards, Krankenhaus.) In this report Germany has made a complete effort to not only standardize the sizes of spreads, sheets, towels, pillow cases, blankets, aprons, gowns for patients (adults, children and infants), employees nurses and doctors, but also to standardize the qualities, weights, colors, etc., of the materials used.

Germany has already made a notable contribution in other hospital commodities such as beds for adults and children, elevators, etc. Their work in its thoroughness is a great step in advance of anything that has been accomplished in the hospitals in this country.

HOSPITALS, A GREAT NATIONAL INDUSTRY

Although hospitals began as charities for the poor, they have now grown to be

a daily necessity serving all classes of society. They constitute a great national industry. The capital invested in hospitals in this country is conservatively estimated at three and one-half billion dollars; this does not include endowments for hospitals. The annual expenditure for maintenance alone is placed at about one billion dollars. New hospital construction for the past few years amounts to about three hundred million dollars yearly. Furthermore, the magnitude of the hospital field expressed in terms of daily

SIZES OF TEXTILES FOR ADULT BEDS

Item	No sizes in Use	Sizes Adopted	Percentage of Elimination	Depth of Hem	Present Standard Packing (Per Case)
Bed pads	63	36 x 36 36 x 72 36 x 76	95	.....	.....
Pillow cases	47	42 x 36 45 x 36	95	3 inches	50 doz.
Sheets	50	63 x 99 63 x 108 72 x 99 72 x 108	92	Top: 3 inches Bottom: 1 inch	20 doz.
Draw sheets	70	45 x 72 54 x 72	97	Top: 1 inch Bottom: 1 inch	20 doz.
Spreads	54	63 x 90 72 x 90	96	¾ inch	50 & 100
Bureau scarfs	49	18 x 45 18" wide by bolt	96	.....	5 doz.
Towels (bath)	42	18 x 36 22 x 44	95	.....	50 doz. 50 & 25 doz.
Towels:					
Face	31	14 x 20	96	.....	200 doz.
Hand	48	16 x 32 18 x 36 18" wide by bolt			100 doz. 100 doz. 40/50 yds. per piece 2000 yds. per case

SIZES OF TEXTILES FOR CRIBS AND BASSINETS

Item	No sizes in Use	Sizes Adopted	Percentage of Elimination	Present Standard Packing (Per Case)
Sheets:				
Crib	17	45 x 64–54 x 90	88	20 doz.
Bassinet	10	36" wide sheeting by bolt		
Spreads:				
Crib	19	45 x 60–54 x 90	89	50 & 100
Bed pads:				
Crib	14	18 x 18	93	
Bassinet	14	18 x 18	91	

population and expenditure is a surprise even to those closely connected and intimately familiar with the hospitals of this country. Over one million, two hundred and fifty thousand people must be housed, fed and cared for each day, representing an expenditure of three million dollars each day.

Those engaged in hospital work understand how difficult it is to obtain the funds to carry on hospital activities. The great progress made in medical science has in turn necessitated a constant expenditure on the part of the hospitals for scientific equipment and investigation. When one considers that hospitals dealing with similar types of cases are seeking the same objectives wherever located, it seems logical for the hospital executives to consider not only the methods of gaining those objectives, but also the ways and means of standardizing the material and supplies used in so doing. There seems to be little hope of securing any marked reduction in hospital costs in the future, unless at the expense of efficiency, except by elimination of waste through simplification and standardization of supplies and equipment. This affords an avenue of economy that has scarcely been approached, compared to its possibilities.

Standards and Specifications from the Standpoint of the Ultimate Consumer

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ACCEPTED usage among economists confines the application of the term "consumer" to those individuals who, collectively, make up the total population engaged in the purchase and use of "end consumption goods." And by the term end consumption goods we mean all goods bought to satisfy personal and family needs and wants, whether necessities or luxuries. On the other hand, goods bought to be used again for purposes of pecuniary gain are not classified as end consumption or consumer's goods.

Thus all goods bought by manufacturing establishments for the purpose of furthering the process of producing goods to be sold on the market are not consumption goods, and the manufacturers are not consumers. In a technical sense goods in the hands of the retailer are consumption goods only when they reach the consumer. To the retailer they represent tied-up capital, and through sale are expected to return a profit.

Who Is the Consumer?

In this article the term "consumer" will be applied only to those who purchase goods for their own or family use, and not to manufacturers or distributors who purchase goods in a finished or semi-finished state in order to effect a resale for profit. Consumption goods will mean those goods which are generally utilized by the "consumer" for consumer's purposes. By so using these terms it will be possible to avoid the use of the terms "end consumption goods" and "ultimate consumer."

Consumers so defined, then, include the total population when engaged in the acts of buying or utilizing goods or services without the object of making money out of their use. Consumers include all classes and races, employed and unemployed, capitalists and laborers. The fact that there are many borderline cases in which it is not possible to determine whether one is acting as a consumer or a producer need not obscure the fact that an essential difference does exist.

Taken in the aggregate the amount of consumable goods bought and used in any given territory is a function of the distribution of purchasing power, the habits of saving of the community and the total quantum of goods produced per capita. The first two of these factors are essentially a product of the habits, customs, legal codes, conventions, and mores of the people. Standardization, as the term is coming to be currently used, is almost purely a technological datum. To the extent that standardization in field, factory and workshop may stabilize employment, it may in some small way affect the distribution of purchasing power, though for the most part this is dependent upon other factors. Likewise, to the extent that it may result in mass

production with lower prices, it may affect the second factor—the savings of the community. But standardization, if given free rein in the productive process, will result for the most part in mass production, increased industrial efficiency (more output of goods with less "input" of time, effort and materials) and will vitally affect the third factor above—the total quantum of goods produced per capita.

It is not necessary to establish here the fact of savings in time, effort and materials possible under standardized conditions in industry. Much controversy exists on that head, but the view is rather generally accepted that the "savings" are material even after due allowance is made for all antithetical factors including a certain restraining influence upon technical development which may possibly be inherent in standardization itself.

Unimpeded by other considerations of a pecuniary or conventional sort, the net result of extending the standardization technique would be a decided increase in the goods and services flowing from the more carefully articulated, more efficient industrial process. Continuing to disregard all the complicating factors, it would follow that the per capita consumption would rise because per capita output would rise. But the modern community is not organized as a body of people working coöperatively to increase the flow of goods without increased labor, on the one hand, and on the other, consuming those goods. The institution of private property and the factors determining conventional distribution of money income produces a situation where what is gain to one is not necessarily nor as a matter of course gain to another. If standardization, under our non-coöperative economic organization, results in increasing industrial efficiency, the benefits flowing from the increased efficiency go first of all, in the nature of things, to the owners of the industrial equipment. Benefits to the ultimate consumer must of necessity, therefore, be secondary, and come through whatever there may be of competition, or of such competition as results in better quality and lower prices.

WHAT FACTORS IMPEDE THE FLOW OF BENEFITS TO THE CONSUMER

Standardization of the sort that is carried on for the benefit of manufacturing economy is a natural development and one that requires little coaxing except in trades wherein the science and technique underlying design and production are at a low stage of development. On the other hand, that type of standardization which has its greatest value in savings that will accrue to the ultimate consumer is a tender plant and needs a great deal of nurture. In the one case, standardization of methods, materials and processes makes for manufacturing economies and these economies will quite naturally in due course be reflected in profits. In the other case, where standardization is conducted primarily for the economy and better service of the consumer, there remains the additional long and difficult process of convincing the potential purchaser of the goods that a truly better and cheaper product is available for his use. The odds against effectively carrying any such assurance to the consumer in a welter of competitive advertising can well be overwhelming. And when the entrepreneur contemplates further the great amount of effort it will require to break down the resistance not only of the customer, but of dealers who have a compelling financial interest in pushing goods which offer a longer margin of profit or which sell more readily on account of established reputation, it can readily be understood why he may

be deterred from taking the difficult path of consumer education or re-education. This is probably in large part the reason why the production of consumption goods has been less touched by standardization and also why when the methods of production of these goods are standardized, the economies tend to flow into increased profits. In other words, competition cannot safely be relied on to encourage standards of design and quality in the production of consumption goods in the first place nor to carry to the consumer the benefits of standardization in the second.

A good example of this failure of competition to react in the consumer's favor may be found in the varnish industry. The Government, through the operation of specifications, a few years ago reduced the price it paid for varnish from $4.40 a gallon to less than 80 cents. It would have seemed quite logical for at least one manufacturer to have adopted the new technique in manufacture and lowered his price correspondingly to the retail trade. But, on the other hand, he would be promptly accused of unbusinesslike practices, or of cut-throat tactics, and the consumer, assuming that the low-priced product was very likely inferior, would confidently select the high-priced one. It is easy to see why a cautious business man prefers to conduct business according to the old methods, or, if he changes his methods of production, to let the savings slip quietly into profits or dividends.

Frequently new methods of production promising significant economies to consumers, and standards of performance or quality are installed, not upon the initiative of the trade itself or any important member of it, but because some large, exceptionally well-informed and technically well-staffed consumer such as the Government is determined to bring about price and quality competition on a new plane. The work of such consumers is not widely heralded and has no sensible influence upon the market resorted to by individual consumers, so that in this case, as in hundreds of equal or greater importance, no significant reflex of the splendid technical work of the Bureau of Standards and other federal technical services is felt by the trade concerned, in its dealings with the general public. Thus it is that an inferior varnish made under the old rules is still selling briskly at around $7.00 a gallon and there is no great likelihood that any large producer will offer the ultimate consumer the fine Government grade varnish at a reasonable retail figure of, say, $1.20 a gallon.

In grease spot removers or clothes cleaning fluids, we have a clear example of how mass production combined with the typical intensive and competitive selling over a period of many years, fails to bring down the retail price to anywhere near the cost of preparation plus a "reasonable profit." A whole family of these products are gasoline or carbon tetrachloride, and 5 cents to twelve cents a pound would allow a 50 per cent markup on quantity costs of the more expensive of the two types. We are forced to pay, however, from 60 cents to 90 cents a pound for these simple materials, and about the same for the gasoline as for the tetrachloride, though the wholesale cost of gasoline is only a fraction of that of the other liquid.

In pointing out the difficulties in the way of consumer's benefiting from standardization, we do not fail to appreciate the fact that our present-day civilization is based on machine production and standardization. The telephone, duplicated to the extent of twenty million substantially identical sets, is a commonplace illustration. Radio sets of which there are said to be now nearly eight million owners, abso-

lutely dependent upon standardized electrical and mechanical relationships between component and related parts is another suggestive illustration. We are all aware that in a world of custom-made goods, only those having very high incomes could possibly possess the goods which are the commonplace of low income groups under mass production. But it is only too evident that this evolution toward the cheap reproduction of goods is very slow, imperfect, and, in many cases, non-existent. The illustration already adduced of the commonplace chemical carbon-tetrachloride and gasoline as a cleaning fluid, being sold at custom-made prices, although a mass produced article, is a sufficient evidence of this, and hundreds of such cases could be cited.

INTERESTED ORGANIZATIONS

What agencies are working in behalf of the ultimate consumer? There are first and foremost the Government bureaus operating in that narrow territory where interesting or useful information can be given without mentioning trade names. With erudition and in minute detail we are told how carburetors can be tested for performance, but are given no results of any of the thousands of tests that have been made, in terms that will enable us to buy the right carburetor for our car. These Government bureaus possess a great deal of relevant and useful information on practically all commodities bought on the market for current consumption. The free distribution of this information would make available to a large number of consumers, significant data aiding in the selection of goods. A more detailed discussion of the work of these organizations is to be found in another article in this issue.[1]

Of all the activities that work in the consumer's interest, that of the American Medical Association in the field of patent medicines and of prepared "ethical remedies" seems the most deserving of propagation. This service, necessary in the main only because certain federal services within the same professional field (public health, pharmacology, chemistry, etc.) are concerned basically with the narrow problems of the Government itself as a business concern or a law enforcing agency, or with that limited scope of recommendations which are not readily reducible to brand or makers names and varieties, is distinguished among all for its fearlessness and for the usable concreteness of its findings, and their effectiveness in guiding physicians in prescribing, or the laity in purchasing, what remain of *bona fide* drugs in the modern drug store.

Such organizations as the National Retail Dry Goods Association, the American Gas Association and the National Electric Light Association, as associations of business men, are engaged in a type of activity which gives them a major interest in standardization of consumption goods. The American Gas Association has a vested interest in safe, standard, efficient gas ranges and other gas-using equipment, as a factor in competing with coal and oil furnaces, and electric ranges and equipment. An analogous situation exists with respect to the National Electric Light Association. In both cases there is a direct interest in the original product, and in the certainty that the same will be utilized in the purchase of current services. The American Gas Association has in operation an excellently planned, equipped and staffed testing laboratory.

The National Retail Dry Goods Association is to set up a national laboratory for the purpose of intelligently and scientifically testing and selecting goods for sale by department

[1] Brady, page 247.

stores. Such work, if well and wisely administered in behalf of the stores' customers and with the coöperation of technical experts having an interest in the needs of the consumer, along the lines of the policy adopted by the American Gas Association in administering its laboratory, can have an incalculable effect on an enormous number of kinds of goods, and it seems probable that the greatest aid to consumers in realizing the benefits of standardization and mass production fully and quickly will come through some such organization. One of the great mail order houses, also, has already laid the basis of such a laboratory.

An embryonic activity also exists in a so-called Consumers' Club, set up as a kind of information bureau and clearing house, to supply confidential information to its members, who are charged a small sum annually for membership, and receive a list giving information about particular goods under brand name, one part being a listing of goods that can be recommended because of their good quality or economy or both, and another part being devoted after the manner of the American Medical Association's listings, to those articles, which on account of poor value for the money asked, or fraudulent or misleading advertising, or other reasons, seem not deserving of recommendation. If the findings of the Bureau of Chemistry, the Bureau of Standards, and of a half dozen private corporation laboratories were available to the compilers of this list, its service to its members would be very great; as the matter now stands, it is a very imperfect experiment to bring information of limited extent and necessarily varying reliability to the aid of the ultimate consumer. Its excuse for existence is that, broadly speaking, no other helping hand is yet offered that enables a layman to translate technical knowledge and specifications for merchandise into economical purchases at the corner store.

While the engineering societies are, almost without exception, occupied with the problems of manufacturers, the American Engineering Standards Committee has recently made a beginning on projects in consumer goods by calling conferences on standard specifications for bed sheets and refrigerators. The American Home Economics Association is rapidly awakening to the need of putting engineering science to work in the solution of problems of the household and are asking for simplification and standardization. They are considering the establishment of a testing laboratory to investigate consumers' goods. This association through its contact with millions of housewives and young women later to be housewives, through the educational activities of its members (who are mainly teachers of domestic science in high schools and colleges), may very likely be the most important agency through which a knowledge of the technique of goods selection and of standards and specifications will be brought to the ultimate consumer.

There is also a tendency toward the development of a new economy—the economics of consumption—a discipline which will in time bring about new concepts of the relation of industry to the consumer, and tend to the turning of industrial production to a maximum of service and utility in fields other than aesthetic.

The enormous expenditure on advertising, which is approaching a total of two billion dollars a year, is a potential agency of consumer education incalculably greater than all others. It does not, however, seem likely, and one is able to judge of this pretty safely following a careful study of the practices recorded in the current flow of maga-

zine, newspaper and billboard advertising, and the views of advertising experts themselves set forth extensively in their special trade journals, that any large proportion of this expenditure will be turned to the consumer's advantage in the measurably near future. It is conceivable, of course, that consumer organizations, such as that typified by the commodity list already referred to, may in time enter the field of advertising as a means of bringing their activities and findings to the attention of the general public, in competition as it were with the sales-making efforts of businesslike advertisers. All these things, however, lie in the future.

The most likely effort that can result in immediate gains for large numbers of the population is one toward a release of data by governmental agencies, including the bureaus of the Federal Government, various technical services of state and city governments, and the state and municipal universities and endowed educational institutions. The latter particularly represent the largest reservoir of goods knowledge and of test and specification techniques outside the Government services, which can, if there be sufficient call therefor, be rapidly extended in the direction of providing information effectively applicable in laymen's purchasing.

WHERE STANDARDS ARE NEEDED

To whichever organization or group of organizations falls the task of aiding the consumer by forcing standards of quality and performance, and through the process of mass production, lower price, there is no difficulty in finding plenty of things to be done. Needless diversity, for instance, in the components of such commonplace devices as sewing machines and typewriters makes it impossible (often through the intent of the manufacturer) to interchange parts such as screws and the common fitments, or even necessary supplies such as needles and ribbons. Lack of standards in these obvious and essential features brings a heavy cost. If standards were established and guaranteed for such things as ease of running, accessibility of parts for repair, durability, noiselessness and many other items, it is safe enough to say that the typewriter would be a much more developed and a much cheaper instrument than it is now. Witness the extraordinary circumstance of the incandescent lamp, whose quality has improved consistently since its first commercial production and which now with eight price reductions since 1920, sells at 44 per cent below 1914 prices, although the cost of goods generally is 65 per cent above the pre-war level. Excellent fountain pen ink can be produced under specifications at a factory cost of only a trifle over that of bottled drinking water as delivered to New York office buildings. Yet in two-ounce bottles it brings a price of ten or fifteen cents. The prime cost of some such commodities, including many kinds of lubricating oil, furniture polish, soap, cosmetics, and the like, is so low that costs of cans, jars, bottles, advertising and transportation are preponderant factors in the total cost of production and distribution. Yet, broadly speaking, no attempt has been made to put such goods upon a basis of local or regional manufacture and sale on an economical basis.

In the household the number of things to be done is legion, not only as to safe standards of quality of bulk goods as a cheap and effective substitute for a diversity of branded and over-embellished package merchandise, but standards of dimension to produce interchangeability (kitchen utensils, vacuum cleaner fittings).

Another important field is that of

providing technical formulae for common materials, much after the fashion of the standard technical recipe books such as those of Henley and the Scientific American, but adding the very important assurance that each formula is tested and known to be among the best, with due consideration both to proper functioning and to economy. This is a job of standardization of major importance, and is well typified by the Government's recent standardization of the Navy's formula for furniture polish, which, like many other household chemical products, is cheap and simple to produce, so that ingredients are simply purchased separately and poured together in a bottle or can by the department making use of it. The ultimate consumer's lack of the simple knowledge crystallized in this formula costs him many millions of dollars per annum in the aggregate, and the finishes on his furniture lack a great deal of being so well cared for. Such formulae should also indicate the cost of the ingredients exclusive of compounding, so that a person referring to such data may know the reasonable price range for the commercially compounded commodity. Such information has always had the effect of producing price competition in goods where competition has not hitherto existed. Very large declines in the selling price of such commonplace goods as lubricants, shoe polish, tooth paste and the like, may be expected as soon as the public in considerable number have access to information as to their incredibly low manufacturing cost, or even of the quantity cost of their ingredients.

Brief mention may be made of two other kinds of standardization that are needed to protect the consumer. One of these is standard trade practices. What does a guarantee by an automobile salesman mean in tangible terms capable of enforcement, when your brakes give out in three months after purchase of a car? If your fountain pen goes bad and you have a twenty-five-year guarantee, but the particular thing that goes wrong is adjudged by the dealer to be outside the meaning of the guarantee, who is to adjudicate the issue? In every such field standard practices should be established not merely by the trade concerned in the production and sale of the goods, but with the full public participation of those who pay for them. (A battery manufacturer once refused one of the authors replacement on an admittedly defective battery because it happened to have been bought at a cut-price retail store.) Reasonable and acceptable trade customs, if recorded in a form easily referred to and conveniently available, in shops dealing in the goods in question, would be very different from what they are under unrestricted evolution. As it is, the seller has all the power of decision, and the buyer, unorganized, comes to regard himself as quite defenseless against the seller's dicta.

Another important field of standardization is in quality of service. In the light and power field, fortunately, the sense of craftsmanship among the engineers is upon so sound and scientific a basis that the maintenance of voltage and frequency upon customers' lines is commonly carried out with astonishing precision, even better perhaps than the customer would insist upon if his opinion were asked. In many other utilities exactly the reverse is true. To cite but one of thousands of types of service for which the consumer lacks any recognized standards,—what provision is there for remission of special delivery or air mail charges when a letter bearing the special stamp takes longer in delivery than it would have taken in regular mail? Is

it not obvious that "back-stamping" of mail to show its time of transmission, as was once the practice, would either shorten the time of transit or dispel the public's illusions about the margin of time which is said to exist and which is paid for at a high rate? Has anyone ever succeeded in collecting for a day's unwarranted delay in the delivery of a telegram or express package? On the other hand, is not the charge made for the telegram or the package mainly based upon the factor of speed of service? Public utility commissions should establish standards of good practice in every common kind of public service, and the adjustment of costs for failure to deliver should be as simple and direct as the habitually prompt and decisive collection for the service in the first instance. If the lighting company consistently ran our supply voltage, say 5 per cent above normal, it would cost us 100 per cent above the normal figure for lamp renewals. Five per cent below normal would cost 10 per cent in illuminating efficiency or 17 per cent in available illumination, of all of which 99 out of 100 consumers are blissfully unconscious, and can afford to be so in larger cities only, because, in the main, the engineering side of lighting service is competently conducted. Yet losses of far greater magnitude occur to every one in respect to service in which the element of rationally and socially predetermined performance has not extensively entered—for example, the frequency of trains in a subway system, the answering time on telephone calls, and adequate pressure, continuous service, and freedom from pollution, in water supply.

In a population composed of individuals possessed of the physical and sociological variations normal to humankind, there is an evident limit to the application of standardization, and the full gamut of its technical possibilities cannot be permitted to be realized. It is inconceivable that a population, except of robots, would tolerate being clothed alike, fed alike, or housed alike at any given time unless under the rigors of military command. Some place between this picture, which some horrified persons view as the outcome of any form or method of standardization, and the irrational and chaotic conditions that now obtain, the habits and conventions of the people will draw the line, "thus far and no further."

The advertisers, for the most part, are committed to a program which will standardize the habit of demanding their own particular types, kinds, or varieties of commodities.

This is the new competition that, in the view of eminent industrial statesmen, supplants the old kind, on price at a quality, or quality at a price, as the life of trade.

If an intolerable increase in the pyramiding of intangible values is to be prevented, it is evident that the consumer must decide when and where he or she desires low-priced, efficient, uniform, mass-produced goods of relatively invariable performance, and when high-priced intangibles and "differences"—uniqueness of the sorts that make the consumer willing to forego estimates of useful and measurable values.

At any given time and with any given set of customs it is possible to draw a fairly clear line acceptable to the great majority of the members of the community alike, between commodities that serve one or the other purpose and are controlled by one or the other mode of determining the price.

Types of consumable goods, whose use is in the main a matter of simple habit, are taken as matters of course and do not enter in any significant way as factors in the maintenance of one's

social prestige, or in the satisfaction of aesthetic taste and appreciation. Such goods permit of standardization on a large scale: kitchen utensils and other household, office, and farm implements, appliances and supplies, timepieces, incandescent lamps, the working tools of the crafts and the professions, and thousands of other goods. Pictures, certain kinds of household furniture, a part of our clothing, personal accoutrements of various sorts, etc., on the other hand, fall into the class of goods commonly regarded as unstandardizable except as to minor or latent or constructional details or constituents (as the kind and quality of fiber, dye and sewing thread used in an opera cloak). Nevertheless, even here the quantities of goods produced in any given kind are so great as to permit of many, and sometimes substantially all, of the economies of mass production. A much wider standardization exists already in goods subject to the whims and caprices of the individual than is currently believed to be the case. Men's clothing (formal and informal, civil and military, ordinary and official, lay and ecclesiastic); women's silk stockings; automobiles; cigarettes and cigarette lighters; fountain pens; reproductions of famous paintings; school curriculums; wedding ceremonies, and funerals; are cases in point.

There seems little reason to fear that when consumers desire and are willing to pay for variety and uniqueness, standardization will be entered into in cases where sameness and monotony in goods would be the expected result; or as a corollary that standardization adopted for the sake of reduction of costs and widening of distribution, will be extended to those characteristics of the goods (color, odor, luster, richness of texture, nicety of workmanship) which afford significant aesthetic values —*provided the participation of the consumer in the initiation and development of the standardization is guaranteed*—as through the intervention and participation of some representative and responsible body. Such standardization as has brought about a loss of individuality and aesthetic values is the result, not of conscious efforts to achieve economy and wide distribution of goods, but of competitive businesslike efforts put forth in the interest of increasing profits, or the omnipresent human tendency to do whatever others are doing in considerable numbers,—whether that be solving cross word puzzles, or wearing stiff starched collars.

Certification Plan and Labeling System*

Methods for Broadening the Field of Supply of Commodities Covered by Nationally-Recognized Specifications, and for Increasing the Market for These Commodities

By A. S. McAllister

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IT is believed that many of your readers will find some items of interest to them in the outline given below of the so-called "certification plan," which is being applied to certain selected United States Government master specifications chiefly for the benefit of the Federal Government purchasing agencies and other public purchasers.

Preparation of U. S. Government Master Specifications

Before giving a description of this plan and telling something of the results now being obtained from its application, it seems well to call attention to the conditions under which the United States Government master specifications are prepared, and to their real commercial significance.

Prior to the organization of the Federal Specifications Board in 1921 each department and establishment of the Government had its own specifications for all materials purchased by it, the specification requirements being often in conflict with each other and seldom in conformity with commercial practice. To avoid duplication of effort in the procurement of material and to insure better utilization of our resources and industries, the Board was given the duty of not only compiling and adopting standard specifications but also of bringing them into harmony with the best commercial practice wherever conditions permit, bearing in mind the broadening of the field of supply.

Each United States Government master specification promulgated by the Federal Specifications Board is formulated by a technical committee consisting of official representatives of every department and establishment interested in the commodities covered by the specification. Full consideration is given by the technical committee to such advice as can be obtained from interested commercial and industrial concerns. The specification thus prepared by the technical committee is submitted formally to all departments and establishments of the Government and informally to various interested engineering and technical societies through the American Engineering Standards Committee. All criticisms received are given consideration by the technical committee in placing the specification in final form for promulgation by the Board for the mandatory use of the Government departments and establishments in the purchase of material covered by the specification.

It will be understood, therefore, that the United States Government master specifications represent a most serious effort to cover by means of specifications commercially satisfactory commodities for use by the Government in its own purchases. Considered as a whole, the 551 specifications formulated

* Publication approved by the Director of the Bureau of Standards of the U. S. Department of Commerce.

by the Federal Specifications Board are probably the best group of commodity specifications thus far compiled. Many of them are far from perfect, but all of them are kept constantly under consideration for revision.

REVISING AND BROADENING THE FIELD OF SUPPLY

To the provisions made for revising the specifications and bringing them into harmony with commercial practice in order to broaden the field of supply can be attributed much of the value of the specifications to Federal Government purchasing agencies and other public purchasers and interested organizations. It is fully realized that the specifications must be subject at all times to revision as the state of the art of production improves, as the quality of raw materials available for a given product changes, and as new limitations are imposed on the use of a product. That these conditions have been given serious consideration, and that they exert a controlling influence on the United States Government master specifications, is shown by the fact that more than 20 per cent of the specifications have already been revised from one to four times since their initial promulgation. Not one of the current specifications has been in its present form for more than six years.

An effective first step in the broadening of the field of supply of commodities covered by United States Government master specifications is taken in the compilation of complete lists of firms manufacturing the general types of commodities which are the subject of these specifications. In compiling such lists use is made of all available governmental and non-governmental sources of information concerning the manufacturing firms, and this information is checked by direct correspondence with the individual firms. To obtain a list of firms of definite use in connection with any selected specification, there are omitted from the complete list such manufacturers as do not build commodities in accordance with the designated specification, and from the smaller list are omitted the names of such manufacturers as have not as yet expressed their desire to obtain contracts based on the chosen specification and their willingness to certify to the purchaser, when requested to do so, that the commodities delivered under contracts based on this specification do actually comply therewith.

Some idea of the value attached to the lists of "willing-to-certify" manufacturers by such officers of the Federal Government as are directly concerned with the Government departments and establishments as consumers (not as lawmakers) can be gained from the fact that the details involved in compiling these lists have been worked out in full accord with the ideas expressed by the Director of the Bureau of the Budget, and the lists are being distributed to all Federal Government departments and establishments at the suggestion of the Chief Coördinator.

Purchasing agencies of all of the Government departments and establishments, wherever their headquarters may be located, are making effective use of the "willing-to-certify" lists of manufacturers. As showing the attitude of these officers, reference may well be had to statements made by the Paymaster General of the Navy concerning the use of these lists, and the action taken by officers of the War Department in distributing the lists, as follows:

Navy Department

It is believed that the data contained in a list of "willing-to-certify" manufacturers would be of great value in building up a mailing list of primary sources of supply who

are known to be familiar with the requirements of certain well-known specifications and willing to comply with them.

The Navy will be glad to take steps to list any firm which has certified its willingness to guarantee that its product will meet a specification of the Federal Specifications Board or a Navy specification, and invite bids from such a firm when in the market. Proposal blanks issued by the Navy contain either the specification printed in full or a reference thereto; and an unqualified bid is assumed to be in strict accordance with the specification and subject to the tests and inspection outlined therein. In this connection, it will be appreciated if lists might be furnished showing names and addresses of firms which have certified their willingness to guarantee that the technical requirements of their product meet the specifications of the Federal Specifications Board.

It is believed that manufacturers will be quick to recognize the potential advertising value of a statement in their sales literature and advertising to the effect that their material is guaranteed to conform to certain well-known specifications.

War Department

In time of war it is very desirable that the Government be able to obtain the articles which it requires in quantity. A more general acceptance of the carefully prepared Federal specifications by general purchasing officers of industry will do much to accomplish this end. Education along these lines is necessary.

To spread the information concerning the specifications and the certification plan, I believe we could do much to further the scheme. The country has been divided into fourteen procurement districts in connection with industrial war planning. All together the Army has established fifty district procurement offices. In each of these districts the regular Army representative is in close touch with many reserve officers who would be mobilized in time of war for procurement duty. In time of peace these men are engaged in widely varying businesses, many of whom are purchasing agencies.

It is proposed, therefore, to send a letter to the Chiefs of all Supply Branches directing the attention of the regular Army executives of the procurement districts to the "certification plan" and the "sources of supply of commodities covered by United States Government master specifications," and to the belief that a more general acceptance of the Federal specifications by industry, particularly by manufacturers and large users, will do much to facilitate the procurement of suitable articles in time of war. The Federal specifications which are the subject of these studies have received the approval of the War Department after the most careful consideration. They are now mandatory upon the Army. Hence, the more generally they are accepted by industry the easier will be the task of buying under them in peace and in time of war.

A recent analysis of the distribution of the lists of "willing-to-certify" manufacturers shows that 75 per cent of the lists distributed have been sent to public purchasers—purchasers buying with the money collected from the public in the form of taxes. Five-sixths of these purchasers are officers of the Federal Government located in all sections of the United States.

APPLICATION OF PLAN

In applying the "certification plan" to the United States Government master specifications, serious consideration is given to the exact status of each specification. Selection is being made first of such of the specifications as are believed to be most nearly thoroughly satisfactory in their present form. Nearly 200 specifications have already been selected for this purpose, and lists of "willing-to-certify" manufacturers of commodities covered by 146 of these specifications have been compiled and distributed in mimeograph form, including 23 relating to bituminous roofing, waterproofing, and paving materials.

A resolution adopted by the trade association representing the industry concerned with these last-mentioned

specifications is of some interest in this connection. This resolution, which was worded to accompany a complete list of the members of the association, is reproduced herewith:

> The following manufacturers, comprising the entire membership of the Asphalt Shingle and Roofing Association, unanimously signify their willingness to certify to the purchaser that the commodities supplied by them under the Federal Government Master Specifications, have been tested and found to comply with these specifications.

When the plans for compiling lists of "willing-to-certify" manufacturers were first formulated, more than 1000 outlines thereof were sent to public purchasers and to the officers of technical societies and trade associations having national recognition. The replies showed that the plans would be fully endorsed by consumer organizations, and that the only opposition to the "certification plan" as such (rather than to certain selected specifications to which it might be applied) would come from such organizations as are not truly in favor of real effective standardization.

It was to be expected that technical societies familiar with the formulation of specifications would be in favor of the plan. Correspondence brought to light the fact that many trade associations that might have been assumed to be opposed to the plan, at least initially, were actually very favorably inclined toward it.

PROMOTION AND EXPANSION

Many of the progressive trade associations are promoting the use of specifications in numerous ways. Lines along which these activities might well be expanded are as follows:

(a) First of all is publicity by means of which the industry is made acquainted with the real significance of the specification method of buying and selling.

(b) Second, but of no less importance than the first, is thorough coöperation in the preparation of specifications that can most properly be referred to as nationally recognized.

(c) Next is coöperation in the undertaking by inducing all of the members of the association to have their names included in the list of manufacturers willing to certify to the purchaser that the commodities supplied by them under nationally-recognized specifications have been tested and found to comply with these specifications.

(d) Trade associations representing either dealers or manufacturers reaching consumers through retailers can be of much help in showing the dealers and retailers how they (as both purchasers and sellers) will benefit from the plan, especially when accompanied by an effective labeling system.

(e) A final step for the trade association to take, *when the time seems ripe for it to do so*, is to make sure that its members are keeping faith so far as the certification and labeling are concerned.

Many agencies carrying on activities somewhat similar to those involved in the certification plan for promoting the use of nationally-recognized specifications, including not only the more progressive of the trade associations, but also inspection bureaus, testing establishments, and guarantee labeling organizations, are rendering valuable services to buyers and sellers at the present time.

It is not to be assumed that all trade associations and all manufacturers are enthusiastically advocating the certification plan. For various reasons certain manufacturers would prefer not to have the certification plan applied to commodities sold by them. It is noteworthy in this connection that practically all of these same manufac-

turers strongly advocate specifications for the materials purchased by them. The fact is that in no case has there not been a considerable number of thoroughly responsible manufacturers anxious to have their names listed among the "willing-to-certify" manufacturers of commodities covered by United States Government master specifications.

Special efforts are being exerted to prevent any misunderstanding on the part of either the manufacturers or the users of the exact significance of the lists of "willing-to-certify" manufacturers. The certificates which the manufacturers state they are willing to issue upon request are to be addressed to the purchaser and not to the Bureau of Standards.

CHECKING AGENCIES

It is expected that adequate "checking agencies" will be developed to prevent the abuse by irresponsible manufacturers of the opportunity to be listed as "willing-to-certify" although unable to "deliver the goods."

A manufacturer who places on record the statement that his commodity complies with a United States Government master specification is shortly made to realize that both his customers and his competitors are vitally interested therein and will check the accuracy of the statement and take such steps as may seem necessary or desirable to prevent any manufacturer from "obtaining business under false pretenses." The process of checking the accuracy of statements of this kind made by competing manufacturers is essential for the protection of the manufacturers themselves as well as the consumers. Both trade associations and better business bureaus have shown themselves to be vitally interested in this subject. By serving as an agency through which the various manufacturers keep watch on their competitors, trade associations can become very active in backing up the certification plan. Non-governmental organizations making use of nationally-recognized specifications can properly render such a service as this, but it would seem unwise for the Federal Government to do so—that is, beyond its own needs as a consumer.

In 1923 President Barnes of the Chamber of Commerce of the United States of America, in discussing the voluntary adoption of standards of quality, said: "In lines of merchandise where conditions warrant the adoption by representative trade associations of certain definite standards of quality or performance, the associations can hold to account any member failing to make delivery up to the standards adopted, and incorporated in sales contracts. Disputes arising in connection with such transactions readily lend themselves to settlement by the parties themselves, or by commercial arbitration."

In any event, the certificates issued by or on behalf of the manufacturer will be given weight according to the reputation for accuracy and reliability of the manufacturer or certifying agency. Manufacturers, certifying agencies, and consumers, all will have need for increased testing and inspection services. For the purpose of meeting this need and facilitating to the maximum possible extent the use of specifications, the National Bureau of Standards has compiled a thoroughly classified list of the laboratories throughout the country that are prepared to test various kinds of commodities to determine whether or not they comply with purchase specifications

MISCELLANEOUS

Reference has been made above specifically to United States Govern-

ment master specifications, as the manufacturers referred to herein are those willing to certify to compliance with these specifications. However, the plan outlined could readily be, and is being applied to other groups of nationally-recognized specifications. It is to be expected that the widespread application of the plan will be of benefit not only in the general promotion of the use of specifications by both the small and large consumers, but also in the unification of specifications having national recognition.

Although no attempt has as yet been made to compile lists of "willing-to-certify" manufacturers of paints and varnishes, several paint and varnish manufacturers have expressed their desire to supply material meeting United States Government master specifications. One of these manufacturers makes the following statement on the labels of his can:

> We guarantee that we will make goods conforming to the United States Government specifications as adopted by the Federal Specifications Board and issued by the United States Bureau of Standards whenever so issued or adopted by them.

In connection with his advertising literature, one of the prominent textile manufacturers certifies that every one of his trade branded sheets "fulfills all requirements of the United States Government master specifications No. 304 for high-count cotton sheets and No. 305 for high-count cotton pillow cases." Concerning his pipe unions a certain manufacturer states that they "conform to U. S. Government master specification No. 393" and are "also listed as standard by Underwriters Laboratories."

It is to be noted that the so-called "certification plan" has not as yet been applied to any of the specifications just referred to. Quite a number of other manufacturers have stated that they are now using, or planning to use, quality-guaranteeing labels with goods manufactured to comply with United States Government master specifications. One of these manufacturers makes three grades of liquid soap, marketed under three different brands. One grade is said to exceed the requirements of the Government specification by a certain percentage, and is priced accordingly; another grade, which is said to "answer every average requirement," is sold at a price somewhat less than that asked for the Government specification soap. The Government specification soap carries the following label:

> GUARANTEE
>
> This Liquid Soap is guaranteed to comply with the United States Government Specification No. 27 for Liquid Soap as adopted by the Federal Specifications Board, on June 20, 1922, when tested by method shown in circular of the Bureau of Standards No. 124. Copies of specification and method of testing will be sent gratis upon application.

By the widespread application of the quality-guaranteeing labeling system, based on certified compliance with nationally-recognized specifications, some of the benefits derived by the large-quantity and medium-quantity purchasers from using such specifications under the certification plan could be passed along to the small-quantity, "over-the-counter" buyer—the non-specifications-using public.

It is to be understood, of course, that the labeling system here referred to is inseparably associated with the certification plan and is not to be confused with the many systems now in operation involving labels the exact significance of which is seldom understood by the "over-the-counter" buyer who is therefore somewhat inclined to discredit all labels.

Much interest has been shown in the certification plan and labeling system by a large number of national and local organizations, including chambers of commerce, better business bureaus, colleges offering courses in commerce and business administration, women's clubs and federations, home economics teachers and associations. Judging from the correspondence with the officers of these organizations it seems evident that manufacturers could make effective use of labels showing compliance of certain of their commodities with nationally-recognized specifications.

The maximum benefit to be derived from the specification method of buying and selling will be obtained when the "nationally-recognized specification" for a chosen commodity has been so formulated as to cover the most satisfactory commodity in the best possible manner, the manufacturers place this commodity in "mass production" in accordance with this specification, the suppliers issue their certificates guaranteeing compliance with this specification, and quality-guaranteeing labels are based on the tests and inspections of this identical specification. The conditions here outlined are ideal and can be realized with very few commodities at the present time. However, they would seem to represent a proper goal for the various agencies concerned to strive to reach.

How Government Standards Affect the Ultimate Consumer

By Robert A. Brady
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UNDER the caption "Gains to the Consumer," an official publication of the United States Department of Commerce lists the following advantages flowing to the consumer from an application of the principles of Simplified Practice to industry:

1. Better prices than would otherwise be possible.
2. Better quality of product through ability of manufacturer to concentrate on better design and through the reduction of manufacturing expense.
3. Better service on—
   (a) Complete products
   (b) Repair parts
   (c) Prompt deliveries.

The Division of Simplified Practice comes under the jurisdiction of the Bureau of Standards, which is, in turn, a part of the Department of Commerce. This being the case, it is to be expected that the above statement represents substantially the views on this head of the officials in charge of the Bureau of Standards and the Department of Commerce.

From the official publications it is not always easy to determine just what groupings the writers have in mind when they employ the term "consumer." It is seldom clear that the "ultimate consumer" is being referred to, and it is generally obvious that the "intermediate" or manufacturing "consumer" is the object of consideration. But there is a considerable run of forceful, if somewhat ambiguous, statements to be found in the written work and the public speeches of the officials of the Department connected with standardization and research work which seem to permit of the construction "ultimate" on their use of the term consumer.

Indeed, Mr. Hoover himself has on numerous occasions committed himself to the belief that "these efforts are in the interest of the public," for, he says, "You and I are interested in this problem solely for a better service to our producers and consumers of the primary necessities and ordinary comforts of life." "We propose," he says in another connection, "more bonnets for the same money and effort." The elimination of waste, largely through standardization and simplification, will mean that "we shall have more goods and services to spend individually." From these and other numerous statements it seems in order to infer that the officials of the Department are, in this connection, publicly and officially, animated by a sincere and earnest solicitude for the well-being of the ultimate consumer. A survey, however, of the work accomplished and under way of the Bureau of Standards does not, at least superficially, support decisively this conclusion.

The Consumer, Government Standards and Specifications

The Bureau of Standards, among other activities, tests practically every conceivable type of commodity to be found on the retail market except food and drugs, drinking water and a few other things covered by the work of

other bureaus. Upon the basis of the tests specifications are drawn, stating the desired properties that must be possessed by the goods when used for a particular purpose. The indexes of United States Army and United States Government Specifications Adopted by the Federal Specifications Board give an encyclopaedic list of end consumption goods from toilet soap to silver ware which the Government purchases according to specifications drawn by the Bureau of Standards or with its coöperation.

Although in the laboratories a large proportion of all significant branded and trade-marked goods sold on the open market have been subjected to test, the Government but rarely purchases except under the specifications. Upon the basis of the written specifications, the Government makes contracts for purchase, following open bidding on the part of manufacturers desiring to secure the Government as a customer. The Government accepts no responsibility, financial or otherwise, for failure of the goods to comply with the specifications when delivered, all losses and expense, by contract, falling upon the manufacturer.

As a result of centralized purchasing under official specifications, the Government has saved large sums of money. It has been estimated that the net savings run as high as $100,000,000 per annum through the research and resulting standardization work of the Bureau of Standards alone, at a cost of around $2,000,000.

This sum of money, or whatever sum may be the correct one, is presumably saved the taxpayer, although it may be small consolation to those who view with apprehension the growing Federal budget. But the specifications as drawn, and the information held in the files of the Bureau of Standards upon the basis of which they are drawn, whether that information relates to branded or unbranded goods, is regarded as confidential, and to be used by the Government alone. The data may be had by municipalities and state governments upon application to the Bureau of Standards provided it is used only for local Government purposes and is not made public in the constituencies of the applicant. In other words, the vast store of information about common necessities, collected in the files of the Bureau of Standards, is not to be released under any conditions to the ultimate consumer to serve as a guide in purchasing commodities on the retail market. It seems to be felt that publication of this material is not the way to go about the job of "benefiting the public." The consumer, it is argued, might or might not understand what the specifications are all about. The chances are he would not. But whether he would understand or not, he is addicted to buying goods by brand name and price, assuming tacitly that there is some correlation, however intangible, between price and the quality desired as laid down in the tenets of the "cost-of-production" theory of value. However frequently he may be misled by specious claims, that habit of thinking is too deep-seated to be easily uprooted. It is probably desirable that it be not uprooted.

PRICE COMPETITION

How, then, is the consumer ever to get even approximately "his money's worth"? The answer runs uniformly the same: *through free competition.* A Division of Simplified Practice Bulletin quotes with approval William Feather, who says that:

> After a man has been in business for a few years he begins to realize that there is a natural law operating by which the benefit

of every new idea is passed on to the consumer. The business man gets the profits from his economies and efficiencies for a little while, but not for long. There is an irresistible force, just as potent as the law of gravitation, which takes these extra dollars and passes them around.

This sounds like "the obvious and simple system of natural liberty" which Adam Smith announced in 1776 as the universal solvent for economic ills. The *laissez-faire* theory has since undergone much wear and tear, but it is still the *leitmotiv* in current theoretical economic thinking. This is not the place to attempt any extensive critique of this theory, but it may be worth pointing out that *laissez faire*, even as originally enunciated, is not assumed by even the orthodox economists to work effectively except under specified conditions.

Some wag has defined *laissez faire* as "Each for himself and God for us all, said the elephant as he danced among the chickens." And that is where the rub comes in. The theory that the advantage of new improvements in the manufacturing process will ultimately accrue to the ultimate consumer in lower prices, better quality, or both is assumed only when all other factors remain the same, "by and large," "in the long run," and "on the whole." There is no "irresistible force" which takes the extra dollars and "passes them around" in the eyes of any economist, ancient or modern, which do not exist *de facto* or *de jure*. Where the laws of the land, the customs and habits of the people, the social, economic and political institutions are not of a suitable climate the *laissez-faire* doctrine cannot be realized in practice. Adam Smith himself wrote the "Wealth of Nations" with the object in view of showing that very fact, and in support of the thesis he inveighed against all the restrictions, governmental and private, which militated against "free competition."

The present is an age of combination and trade agreements. Horizontal combination, vertical integration, "Gary Dinners," trade association agreements, communities of interest through interlocking directorates, holding companies, etc., are universal contemporary phenomena. The elimination of price competition is the most common objective if one can judge by the histories of combinations. The obvious reason is that price competition cuts into profits and profits can be kept high if competition can be eliminated.

Advertising Opposed to Price Competition

The devices used to achieve this objective are numerous. Advertising has as one of its principal, if not its major, objectives the lifting of goods out of price competition. James H. McGraw, of the McGraw-Hill Publishing Company, who recently received a gold medal "for distinguished contemporary service to advertising" from the Graduate School of Business Administration of Harvard University, commends advertising because "It removes products from unhealthy price competition as fast as it can unearth distinctiveness in products and organizations. . . . It offers new weapons of quality and service in the business struggle with meager profits."

The Standard Oil Bulletin recently announced that "a price cutter is worse than a criminal," and then proceeded to state the "reasons why." The statement was widely quoted in the advertising and trade journals throughout the country. In any current issue of any of the numerous advertising and trade journals fragments of this contention can be found elaborated. Lillibridge, an advertising

agency eminent in its reputation as a seller of industrial products (appealing largely to the Engineering profession) states in *Time:*

> The final purpose of advertising is not to prove the comparative superiority of the article in competition. The object of advertising is to TAKE IT OUT OF COMPETITION, so that it will no longer be compared but will be accepted by the buyer.

When the advertisers announce that they are giving better "quality" or better "service" for the same money, they are at least giving lip service to the popular conception that there is some correlation between price and quality of goods. It amounts, in the popular apprehension, to the statement that they are lowering price, since the cost-of-production theory assumes a straight-line correlation between price and quality. If, then, advertising is devoted to the task of taking goods out of price competition, or, in other words, of preventing the cutting of price and the consequent cutting of profits, the net effect is to give less quality for the price charged rather than the reverse—that is in terms of the cost of production to the manufacturer. If this is the case, then the advertisers are guilty of either sophistry or hopelessly confused thinking.

Mr. Hoover recently endorsed advertising without serious qualification, leading one to believe that he does not realize, in view of his numerous statements espousing price competition, what the advertisers are about or say they are about. This would be unforgivable ignorance. If Mr. Hoover is not concerned with the fact, this, in view of his statements expressing concern for the public weal, would be sophistry or it would mean that he was caught off his guard.

All of the generalizations stated above are a matter of common notoriety to the average college sophomore who has taken a course in elementary economics, old-style or new-style. Any of them could relate the obvious facts that "price-competition" so stated, without serious and important qualifications, is a meaningless statement. To argue that it must aid the consumer through the interplay of "irresistible forces" is but to confer ignorance of the most patent facts of the modern market situation.

SIMPLIFIED PRACTICE

It should be noted also that much of the work of the Division of Simplified Practice is with commodities which do not vitally concern the ultimate consumer. Compared and contrasted with the end consumption goods listed for sale in the catalog of any mail order house, the projects undertaken by the Division seem to be utterly insignificant. Practically none of the goods important from the point of view of household expenditure, from safety matches to items of clothing, from kitchen tables to radio, have been touched upon by the Division.

A great deal of the Simplified Practice work relates to building materials used for a large part in the construction of office buildings, apartment houses and private dwellings. It is a matter of common knowledge that rentals do not in any essential sense depend upon the cost of construction. Cost of construction *is* a factor, but a minor one, in determining rentals. A much more important factor is land values, and it is impossible to separate land values from building values.

High building costs do not mean high rentals, nor low building costs low rentals in and by themselves. A view of the Hudson from the bathroom window is more instrumental in caus-

ing high rentals than the type of tile on the bathroom floor. It seems safe to say that reducing the cost of building materials is to divide the savings or profits between manufacturers and landlords.

Certification Program

Partial recognition of the fact that simple endorsement of the theory of free competition is not a cure-all for the industrial forces that may prevent the consumer from gaining from technological improvements is implied in the adoption by the Bureau of Standards of the Certification program. Briefly stated, the Certification plan provides an arrangement whereby manufacturers of a given commodity can enter their names on a "Willing-to-certify" list, indicating their willingness to manufacture the given commodity in compliance with the Government master specification. The goods sold to the public will presumably be advertised as having been so manufactured.

Many manufacturers have expressed their willingness to certify as provided in the plan. For the most part, the goods produced under the Certification agreements are not end consumption goods. The immediate gains, if any, go mostly to manufacturing consumers or toward lessening manufacturers' costs. In no instance is there any provision regarding what is to happen to price as cost of production falls. The Government does not propose to force the manufacturers to live up to the Government master specification even though the manufacturers have expressed their willingness to certify and are so stating in their advertising to the public. It is assumed here that competition and the "honest" manufacturers will take care of this end of the game.

One way the consumer, whether manufacturing or not, can check up on goods purchased for use from manufacturers certifying compliance with the Government master specifications, is by testing the goods as delivered. The Bureau of Standards has issued a list of Commercial and College Testing Laboratories to whom people interested can go for such tests. The list is not being widely circulated among ultimate consumers, and even were it so circulated there seems no direct reason for believing that as unorganized consumers, their voice would be at all effective in policing business. Again the argument falls, for all essential purposes, upon a confession of faith in the formula of free competition.

Finally, we receive this from an eminent technical expert in a Government Bureau:

> We may pity the poor ultimate consumer because he is not well organized and cannot protect himself, but every man, and the Bureau, must look out for its own hide first, and from that point of view we have to recognize that the ultimate consumer, being unorganized, cannot protest so violently at our acts of omission as the organized producers can protest at acts of commission. Hence, when in doubt, do nothing.

Plainer words are not required.

Summary

The Federal Government, whose officials have expressed much solicitude for the ultimate consumer, possesses a vast store of useful information which it refuses to make available to the general public, because of a feeling that it would do great damage to business, and because business, if let alone as provided in the theory of "free competition," will, through "price competition," be forced to pass the benefits on to the ultimate consumer who, presumably, thinks in terms of the cost-of-production theory. "We would not last a week," a responsible in-

formant suggests, "if we published the results of tests." There is no reliable evidence to date that the benefits of Government research, given to manufacturers, have been passed on to the consumer.

On the contrary, there is much reason for believing that the benefits are going no further than an increase in manufacturer's profits. The aid the Government has given to business has come at a time when combination of one sort or another and advertising are becoming most effective in stifling that competition on which the Government officials orally rely as the working force which will insure consumer benefits out of the business process. The rising curve of "distribution costs" would indicate a large measure of success for the advertisers.

In the face of the fact that all the advertising journals repeatedly declare their disbelief in the advantage of competition since the same cuts in on profits and further declare their intention of destroying its nefarious practice, Mr. Hoover has officially endorsed advertising. Many of the trades associations exist, patently and probably all of them in part, for the purpose of preventing price cutting. The Certification plan provides no protection to the ultimate consumer. Its teeth have all been drawn.

Lack of knowledge of the facts presented above would argue high incompetency on the part of the officials concerned. Knowledge of the same facts would lend color to the contention that the departments, bureaus, and divisions are concerned with aiding manufacturers and business men to increase their profits regardless of whom it may concern. The contention that "price-competition" either will occur under modern conditions, or if it should occur that it would, in itself and of necessity, and without widely accepted standards of quality and of trade practices, bring better and cheaper goods to the door of the consumer is either a bit of specious sophistry or an indication of appalling lack of knowledge of either economic "first principles" or of modern economic conditions. Certainly the burden of proof that this is not so is upon the responsible officials concerned and to date proof has been entirely lacking.

Can Standardization Reduce Advertising Costs?

By Hugh Elmer Agnew
Professor of Marketing, New York University

EACH year the cost of advertising in the United States is $1,250,000,000. That is an estimate which bankers and statisticians agree is conservative. What part of it, if any, can be saved by further standardization of products and extension of buying by specification?

The advertising manufacturer has an even greater interest in reducing his advertising expense than any part of the public including the reformers. It is a painful operation to separate a hard-headed, tight-fisted board of directors from a lump sum for advertising that might, if applied to dividends, double them. Relief from the ever-growing competition in advertising, whether by standardization, or any other legitimate device which will not jeopardize the good will of the business, will be most welcome. To what extent will standardization help?

In the table below are 23 classifications of goods, and, with each, the amount of money spent to advertise it in the 32 leading magazines of the country in 1926. These are the latest figures available at the time this is written. Probably the division of advertising funds in other media would be roughly parallel.

Magazine Advertising Expenditures for 1926 by Classes*

Automotive industry	$21,186,884
Building materials	6,790,164
Cigars, cigarettes and tobacco	2,268,247
Clothing and dry goods	7,438,626
Confectionery and soft drinks	2,286,503
Department, mail order and chain stores	815,130
Drugs and toilet goods	$19,787,927
Foods and food beverages	21,093,402
Furniture and furnishings	15,354,993
Garden	346,246
General (non-manufactured products)	5,319,635
Jewelry and silverware	3,548,428
Lubricants and gasoline	2,419,011
Machinery and mechanical	1,673,869
Musical instruments and radio	5,040,632
Office and store equipment	2,251,329
Paints and hardware	3,977,986
Shoes and shoe furnishings	2,700,833
Soaps and housekeepers' supplies	6,153,697
Sporting goods	591,805
Stationery and books	3,781,936
Travel and amusement	4,054,649
Miscellaneous	567,256
	$139,449,188

* Figures are from *National Markets and National Advertising*, compiled for the Crowell Publishing Company.

Class 1. The leading advertising industry, as might be expected, is automotive vehicles and accessories. With the full interchange of patents that prevails, and the employment of hundreds of engineers, standardization is here possible on a scale that few other industries permit. Yet the style element remains supreme. It is impossible to sell an unadvertised car at a profit. Here standardization offers no relief from the burden of advertising.

Also, the full equipment of automobiles with roller bearings, speedometers, bumpers, etc., etc., has largely been forced by advertising. Even such materials as vanadium steel were neither accepted nor adopted by the engineers until it was forced upon the attention of manufacturers by magazine advertising.

Class 2. Building Materials. Here again the work of standardization has gone a long way. Indeed, it has gone so far that improvements often have to

be forced by advertising to get consideration from architects. This was the case with an improved radiator valve. For two years, personal salesmanship and advertising in architectural and plumbing publications made little headway until a consumer advertising campaign created a demand on the part of owners that architects and builders *had* to recognize.

The sizes of windows, doors, and materials, have been standardized to the great benefit of all concerned. Contractors give building owners a choice of several heating plants, all so similar that there is scant grounds for selection, yet the manufacturers continue to advertise.

On the whole, the advertising for building materials is increasing rapidly. In 1922 the amount spent in magazines was just under four million dollars. In 1926 it was nearly seven million. Here, as in many instances, standardization has helped to reduce manufacturing costs—including building—but it has not yet helped to reduce sales costs.

The experience of many manufacturers, like those making face brick, is that they can educate the public *and* the architects for less money than they can convert the professional men alone.

Class 3. Cigars, Cigarettes, and Tobacco. Obviously standardization can furnish no relief in sales costs for these items except in reducing the number of brands. When the General Cigar Company was organized it cut down the number of brands of its component members from 152 to five. That effected a vast saving in the cost of manufacture and considerable in sales costs, especially if printing fancy labels is regarded as a selling cost, at least in part.

Class 4. Clothing and Dry Goods. Style articles, which constitute a very considerable part of this classification, are admittedly out of consideration. Standardizing sheetings, hosiery, and other staple goods would seem to offer possibilities. But no store wants to admit that it has exactly the same goods as every other store. That is why so many object to handling advertised brands. They want something different.

One of the leading shoe manufacturers holds the trade of two of New York's largest shoe stores by putting the store's name, rather than the manufacturer's on stock shoes.

Relief in selling costs through standardization is a remote possibility in this classification. For even if standards were adopted, it would take years and cost millions to teach the public to understand and accept specifications.

Class 5. Confectionery and Soft Drinks on the one hand, and

Class 6. Department Stores, Mail Order and Chain Stores on the other, offer little for interesting discussion. They help to illustrate, however, one of the forms of standardization adopted by marketing men. Practically all advertising records are now founded upon the same classification of goods—the one given here.

Class 7. Drugs and Toilet Goods. The average druggist carries about 5000 different articles of household use. The very magnitude of teaching the public to recognize by brand name more than the commonest ones is appalling. But what about instructing them to understand specifications? The imagination falters.

Advertising has helped to reduce the number of brands of tooth paste to less than forty. The shaving creams are nearly all sold under less than ten brands. Six or eight of the great drug manufacturers prepare nearly 60 per cent of such common remedies as milk of magnesia and cascara. Stock of an

even half dozen toilet soaps constitutes a good assortment. Thanks to enterprising advertisers, this small number of brands effects a great economy in retailing. It reduces the investment, the amount of space required for storage and display, spoilage from shelf-ware, and trouble in keeping up supplies.

Perhaps chemists will devise a perfect toilet soap, and so standardize it that it will be as staple as granulated sugar. But so far they haven't. Yet if they do, it would take millions in advertising to convince a skeptical public that the formula soap was better than the one they had bought by name.

Class 8. Foods and Food Beverages. Only a few of the foods are advertised, and they are in the nature of luxuries rather than staples; like granulated sugar mentioned in the above paragraph. It is extremely doubtful if standardization or specifications can be substituted for brands which people have found reliable. A few years ago, what was then The General Chemical Company, put out a new baking powder which was as nearly perfect as the best chemists could make it. But it was finally abandoned after an immense loss. People simply would not accept it. To the Smiths and Johnsons and Joneses and Cohens food chemist meant one who concocted adulterants and substitutes, many of which were questionable. The fight brother chemists made against Dr. Wiley had stamped them as enemies of the people, even as the good Dr. Wiley was the friend of the people.

Now the chemists have reformed—many of them—they no longer make a living by preparing coal tar products to sell as fruit juices. But Mrs. Soloman of New York, Mrs. Ashley of Omaha and Mrs. Mason of Seattle have not yet heard of the reformation. Their confidence has not been restored. They do not want goods made after the specifications of those chemists. And unfortunately it would cost more to *sell* the food chemists to the country than to advertise many brands of foods.

Furthermore, and even more important, is the fact that the gustatory qualities of most foods cannot be determined by chemical analysis. Even the Government has despaired of chemical analysis as a basis for fixing the quality of tea for import duties, and relies upon a "tea taster."

Class 9. Furniture and Furnishings. Is it possible that Sinclair Lewis is to be further tortured by a greater standardization of home furnishings? Animosity for the Babbits is founded upon a lack of taste evidenced in standardized living. Surely manufacturers of goods of this class cannot hope for relief for their magazine advertising budget of $15,350,000 in the near future By the way, that budget has more than doubled in the last five years.

Classes 10 and 11. Garden Supplies and Non-Manufactured Products include such businesses as insurance and correspondence schools; all are obviously outside of standardization influence in so far as advertising is concerned.

Class 12. Jewelry and Silverware. Here advertisers have taken the matter of standardization into their own hands and have agreed upon the use of such terms as sterling, plate, and even what constitutes "silverware." But the magazine advertising has increased more than a million dollars since the standardization of terms.

Class 13. Lubricants and Gasoline. Here surely would seem to be an opportunity for standardization to offer relief in advertising costs. From 80 per cent to 90 per cent of the business is handled by five of the great oil companies—counting the Standard Oil group as one. Few consumers have a decided preference for any brand of

gasoline, and no particular reason for choosing any one lubricant rather than others. But the advertising is such a small cost of the consumers' price that they cannot hope for much relief. From 1 per cent to 2 per cent of the refiner's sale price makes a liberal advertising appropriation. Refiners continue to increase their advertising appropriations, evidently convinced that it is necessary for a growing business.

Class 14. Machinery and Mechanical Supplies. This includes electrical supplies—other than radios and vacuum cleaners—as well as pumps, belting, water supply plants, etc. I do not feel capable of discussing the effect of standardization upon this class. But from an advertising standpoint it is not very important, as the whole amount spent in magazine advertising in 1926 was $1,673,869.

Class 15. Musical Instruments and Radio. Radios are still in the formative period. Pianos are quite generally standardized in most important features. Phonographs have recently undergone a sweeping change. But the advertising for all continues. It is largely devoted to educating people to an appreciation of the pleasures that music will bring into their lives. So it will be unaffected by further standardization.

Class 16. Office and Store Equipment. Quite generally standardized, but still advertised.

Class 17. Paints and Hardware. That paints and varnishes might be more highly standardized for the benefit of all concerned seems probable. It also seems probable that if wide publicity were given to the specifications used by the Government in buying paint supplies, it would enhance paint values for many consumers. Such publicity could conceivably compel changes in manufacturing processes for some of the best known brands of paint and varnish. But with the immense cost of public education in what constitutes a good paint, and with the development of such new products as the celluloid paints, it is not apparent that standardization can reduce the selling costs in the paint industry, at least not for quite some time. As to hardware and tools, advertising has never been an important item except with three or four manufacturers. All of this advertising in the magazines for 1926 amounted to but $650,000.

Class 18. Shoes and Shoe Furnishings. Here again the style element is of major importance. Men's shoes are more generally sold by brands than women's shoes. Both in the number of pairs and in the amount of money paid for them, the sale of men's shoes has been actually on the decrease for several years. Probably half of the footwear for men carries the brand of the manufacturer. Less than a fourth of women's shoes are sold under manufacturers' brands. There has been a moderate increase in the dollar sales of feminine footwear, probably due to the style appeal, high prices, a fragile product, and the social necessity of having shoes of different colors. Standardization will offer no relief.

Class 19. Soaps and Housekeepers' Supplies. Owing to extensive advertising of the leaders, the number of soap manufacturers has decreased from over 1200 to less than 400 since 1915. Even such extensive operators as Procter & Gamble have not found it possible to reduce soap making to a formula. So standardization or specification buying seems hopeless with soap.

Other supplies like insect powder, brooms, starch, etc., offer no great possibilities. They make up a very small part of the family budget.

Class 20 and Class 21. Sporting Goods, Stationery and Books. These do

not fall within the present practical application of standardization as seen by the marketing man.

Class 22. Travel and Amusements. The one striking example of standardization found in this class is the famous Century Limited and, its leading rival, the Broadway Limited. Both trains are so similar that if a "section" of one should be switched on to the other's track, passengers might not discover the difference. Both leave New York and arrive in Chicago at the same time. The fare is the same, the over-charge the same. Yet the well-advertised Century carries about three times as many passengers as its competitor. Standardization here has not reduced either the costs or effects of advertising.

Class 23. Miscellaneous. This includes telephone advertising, wireless for communicating with ships, grave vaults, tombstones, dog biscuits, political advertising, etc. It amounted to a little over $500,000 in 1926, and is not important.

Of the 23 classifications of goods, only two—Lubricants and Gasoline, and Paints and Hardware—seem to be of a nature to permit reduction in advertising expense by standardization. In neither of these is it certain that such a result would follow: they offer only possibilities.

The writer is aware that the excessive influence of style is often charged to advertising. And he is frequently told that if the advertising were discontinued, a more durable standardized product would result. Real students of marketing know that to be an error. Advertising graveyards are filled with the remains of those who have tried to dominate styles. Pope and Columbia bicycles were extensively advertised; hairnets were supported by the most extensive and expensive publicity; Heatherbloom petticoats and Warren's "featherbone" were once featured in every woman's magazine. Where are they now? Fashion decreed that they must pass. And like the laws of trade, dictates of fashion are stronger than the laws of nations.

No wise advertiser attempts continuously to dictate styles. He follows and profits rather than leads and fails. Advertising can speed and spread and prolong fads until they become fashions. It cannot, except on rare occasions, create fashions. In a very substantial way, advertising is a factor in standardizing style goods. There are fewer styles at any one time than there would be without advertising. Bobbed hair and knee-length skirts are not confined to fashion centers. It is very different now from a half century ago, before advertising became a real factor in our lives. Lincoln complained that his tailors did not make the kind of clothes that were worn in New York and other smart Eastern cities. Now man's dress on Broadway, New York; Main Street, Kokomo; and Pike Street, Seattle, are of one pattern—highly standardized. The fashion pages of the magazines have brought this about, or at least made it possible. The same influence has nationalized, even if it has failed to standardize, women's wear.

Advertising and standardization should not be antagonistic. In the cooperative marketing of farm products, standardization preceded and made advertising possible. Oranges, apples, raisins, and prunes had to be rigidly sorted and graded before they could be profitably advertised. Indeed, spreading the news of a dependable (standardized) quality constituted a very considerable part of the advertiser's message.

In another field of marketing, the lack of standards is prohibiting profitable advertising in many cases. That is in coöperative advertising. This,

by the way, should be distinguished from coöperative marketing. In the latter, producers turn their products over to a central agency for distribution and sale. This agency may or may not advertise. In coöperative advertising, competitors who sell their products independently may unite to extend their markets by advertising. The "Save the Surface" advertising of paint and varnish manufacturers, and the "Say it with Flowers" campaign of the florists, are examples of coöperative advertising.

As standards for whole industries are adopted, it will be necessary to educate consumers as to the value of these standards. This will mean advertising. Also, advertising will still be necessary to meet indirect competition, which is fast coming to be the most sharply competitive advertising in the whole competitive field of marketing. One industry competes with another rather than one manufacturer with another. The automobile is a more dangerous competitor to the Erie railway than any other road. Wall paper competes with paint; composition roofings with shingles; the radio with the phonograph, and both with pianos; cereals with meats; food with clothing; moving pictures with house furnishings; and so to the last article on the shopping list. Literally every one, including the savings banks, is bidding for your dollars, just as you are bidding for theirs. When all these goods are standardized to the farthest practical limit, there will still be competition that will avail itself of the influence of advertising until some more effective means of educating buyers is discovered.

As the market man sees it, standardization pertains to staples, and advertised brands to goods of the luxury class. The part of the family budget spent for advertised goods has never been accurately determined, but is relatively small. This is indicated by the sales of retail stores which advertise. About one-fifth or one-sixth of sales are goods which the store features in its announcements. The other four-fifths or five-sixths of sales are of goods not mentioned. Standardization is thus left the major part of the family budget and, both in manufacture and distribution costs, it is making an effective saving. But there seems to be little possibility at present that it can relieve the advertising burden.

Book Department

BEARD, CHARLES A. and MARY R. *The Rise of American Civilization.* 2 volumes. Pp. Volume I, 828; Volume II, 824. Price, $12.50. New York: The Macmillan Company, 1927.

In plan, scope and method of treatment this is a monumental work which should occupy a high place in its field. The plan is a synthetic view of American progress. The scope includes chiefly economic, but partly also political, social, and scientific factors.

The method of treatment is a flowing narrative commencing with English colonial policy and ending with the so-called machine age of present-day America,—an interpretation but not a discussion. The work is divided into two main epochs, the agricultural and the industrial, a division which is, of course, a loose and approximate but convenient one. In the agricultural age the authors sketch the settlement and growth of the colonies, the English trade policies, the clash between metropolis and colonies, the approach and culmination of the revolution, the slow cementing of the new nation, the rise of the new agricultural states in the West and the final growth westward to the Pacific. The economic influences of agriculture, free-land and slavery in creating political issues are clearly set forth in an interesting chapter on "The Politics of the Economic Drift."

In the industrial age one hears first the rumbling of an approaching and irrepressible conflict, the clash between Northern industry and Southern slave-holding agriculture. Next the struggle itself, and then "the second American revolution." This revolution was industrial as well as political and social.

Next comes the organizing of the Western areas of our land and the rise of a distinct spirit of business enterprise in which organization, management, industrial initiative and large scale production played the essential rôles. There follows the political effect of industrial growth, the search for more worlds to conquer, the rise of the imperialist policy.

In the penultimate era, "the gilded age," the authors sketch the gradual decline of old standards and ideals in business, in social relations, in politics and in the morals of everyday conduct. This age seems to serve as a solvent or transition from the primitive American to the modern sophisticated view of many things, from national policies down to national tastes in humor and art.

Closely following it comes the trend towards social democracy. Comparatively little space is given to the Great War, but much to the return to normalcy and the overwhelming triumph of the industrial machine age. In this triumph not only industry but all phases and stages of distribution, art, theatre, religious organization and social uplift were made to follow the conquering chariot of the spirit of standardized organization.

Shall the power of the industrial machine subdue and tame all the forces of human energy physical and spiritual? Or, can the machine itself by the "invention of invention," that mysterious instrument of the modern mind, be made the servant rather than the master?

The authors conclude by quoting without endorsement the general opinion, as distinct from that of the specialists, that unlimited progress is still before us. This is based on the invincible belief in democracy, in the ability of the masses, "as contrasted with heroes and classes" to meet effectively the issues which are to come.

The method of treatment is distinctly uneven and varied. There are no footnotes, no detailed references even to quotations. The narrative flows like a tale; it roams freely and at times capriciously over vast stretches. Occasionally it pauses for a moment and one listens to an intensive description of some typical incident. The style runs easily and there are in places delicate shadings and nice discriminations of meaning contrasting with broad impressionistic dashes of color. As the narrative nears recent events the tone becomes

ironical and even caustic. The reader feels that the men of the present generation in business and politics alike will bear watching; he feels also more keenly than before the insidious approach of large organizations of predatory wealth and their ever stronger control over national welfare and national policy. At the last one has a distinct sensation of uneasiness in reviewing the steady inexorable march of plutocracy. It is hard to escape the conviction, which the authors however nowhere specifically state, that Wall Street has captured us body, soul and breeches.

The style is clear and interesting. It is hard to lay the book down. One might wish for an occasional kindlier estimate of public men or a lighter touch of acid on the motives that are woven through recent events, but one never finds the narrative dull.

The work gives evidence of intensive and prodigious reading, also of an admirably organized process of boring, extracting, assembling, appraising and ever questioning. The distinctive contribution of the work is the successful effort to review all phases of American history from an economic standpoint.

JAMES T. YOUNG.

WILLOUGHBY, W. F. *Principles of Public Administration.* Pp. xxii, 720. Baltimore: Johns Hopkins Press, 1927.

Professor Willoughby's avowed purpose in writing this 700-page volume has been "to resolve the exceedingly comprehensive and complex problem of public administration into its constituent elements" in order to present "a general analysis and picture of administration as a branch of political science." As Director of the Institute for Government Research at Washington, the author has had an unique opportunity to study in combination the theoretical and practical sides of the administrative technique. The special phases of public administration which receive consideration are General Administration and Organization, Personnel, Material, and Finance.

According to the subtitle of the volume, it is the aim of Professor Willoughby to consider the principles of public administration as these have developed both in the national and state governments of the United States. It is evident, however, that the author's acquaintance with the facts in the field of state administration is somewhat limited. For example, in the discussion on Finance, to which he devotes over two hundred pages, the matter of executive control of expenditures in the states is passed over with the remark that "information is not at hand to permit of a statement" (p. 504). In view of the emphasis given in the introductory chapters to the managerial phase, and particularly in view of the very lengthy discussion on the preparation of the budget, it is somewhat surprising that the execution of the budget should receive such slight consideration.

There is also a tendency in certain portions of the volume to state "principles" in rather cavalier fashion. For example, on page 11, one reads that the administrative function "resides in the legislative branch of the government," and yet the administrative function, as defined by the author on the same page, "is that of actually administering the law as declared by the legislative, and interpreted by the judicial, branch of government." In the opinion of the reviewer, this is tantamount to saying that the legislature is the executive. The fact that the legislature is the source of administrative authority certainly does not make the function of administration reside in the legislature. One is likewise inclined to question the premise that the legislature is the source of all administrative authority. Also to say that the constitutional doctrines of *United States* v. *Kendall* and *Kendall* v. *United States* have not been disturbed since the day they were first issued, as Professor Willoughby would have us believe, is to ignore completely both legal opinion and the facts of administrative practice since the time of Andrew Jackson.

It is evident that the author has given careful study to the problem of the reorganization of the national administrative services, although students of administration will be tempted to take exception to some of his suggestions. While he is a strong advocate of the idea of integration, he recommends that revenue-producing services should be set up as distinct public or quasi-public corporations. This would mean

administrative autonomy for the Postal Service, the Panama Canal, the Alaskan Railway, the Inland Waterways Corporation, the Merchant Fleet Corporation, etc. Agencies exercising quasi-legislative and quasi-judicial duties should be relieved of duties of a strictly administrative character, and then the activities of these agencies should not be subject to executive direction and control.

The problem of Personnel and the problems of Accounting and Auditing are treated in great detail. It is in these chapters that the author brings together valuable and useful material. It is also here that the principles elaborated show the results of careful and intensive studies of the problems considered. This discussion, together with the discussion on preparing and formulating the budget, represents the best part of the work.

While the author might have condensed his material and reduced the volume to two-thirds of its present size, nevertheless, he has presented us with a useful and thought-provoking text for the study of public administration. The summary descriptions of bibliographical material enhance considerably the merits of the volume.

MARTIN L. FAUST.

HERSHEY, AMOS S. *The Essentials of International Public Law and Organization* (revised edition). Pp. xxii, 784. New York: The Macmillan Company, 1927.

This revision of Professor Hershey's well-known text combines the excellencies of the original edition with some useful innovations. Among the former is the careful distinction between text and footnote which has made possible a concise text indicating the established doctrines of law, in close proximity with a wealth of illustrations and references for further reading in the footnotes.

The introductory historical chapters have been brought up to date, and, as the title indicates, in the body of the book the new developments in the field of international organization have been stressed. The author is convinced that after the temporary setback of the World War the "new world order has secured a fairly firm footing" and that, "mainly due to the agency of the League of Nations, international law is passing through the greatest period in the history of its development" (p. viii).

The practice followed in the original edition of quoting in the text pertinent extracts from international documents, like the Hague conventions, has been continued in the case of the League of Nations Covenant and the statute of the Permanent Court of International Justice. The opinion of the author on the relative importance of the different fields of his subjects is indicated by his relegation of the "so-called laws of war and neutrality" to less than one-third of the book.

The revision has been careful and the index is complete. Teachers and students will find the book a thoroughly usable text and investigators will usually find in the voluminous footnotes references for further study of almost every problem.

QUINCY WRIGHT.

MACDONALD, AUSTIN F. *Federal Aid: A Study of the American Subsidy System.* Pp. xii, 285. New York: T. Y. Crowell Company, 1928.

This book presents a systematic survey of federal grants in aid to the States and their subdivisions, and is written on the basis of an extensive field study covering a large part of the United States, in the course of which Mr. MacDonald made a wide range of contacts. The volume describes *seriatim* our experience with federal grants in forestry, agricultural extension, highways, the National Guard, vocational education and rehabilitation, and the hygiene of maternity and infancy.

Here may be found the most extensive description of federal aid which has yet been written, together with some extremely important generalizations which go far to substantiate belief in the wisdom of a reasoned development of this administrative device. Thus the author concludes, *inter alia*, (1) That federal aid has stimulated state interest and activity, (2) that it has raised state standards and established a national minimum of efficiency, and (3) that there has been no unreasonable federal interference with state policies or with the details of state administration. He reports also that state politics has not been eliminated from

coöperative work, although its influence has been reduced.

One wishes that Mr. MacDonald had felt more free to reveal the inner working of the federal aid system. For the most part he draws a discreet veil over the points at which friction has arisen, which after all are precisely the points at which the real issues arise. His illustrations are too often anonymous and the enormous number of specific cases which must have come to his attention and which would have been of the liveliest interest to the student of administration still remain in his brief case. One misses also a general but critical view of the whole subject, which Mr. MacDonald is so well qualified to give.

These comments need not disguise the fact that the volume is a much needed contribution to an important field of inquiry, which should be examined and reëxamined from many points of view.

LEONARD D. WHITE.

University of Chicago.

CALLENDER, CLARENCE N. *American Courts.* Pp. viii, 284. New York: McGraw-Hill.

This book is extremely well written. Though by a Philadelphia lawyer, it does not take "a Philadelphia lawyer" to understand it. It elucidates our court systems, both state and federal, in words of one syllable for the laity. But let not any lawyer turn up his nose at it on that account. This reviewer, though a teacher of law for many years, found its perusal both pleasant and profitable, and is going to recommend its purchase to all his first-year students. The appendix, showing in tabular form the court systems of the various states, is valuable. The chapter on commercial arbitration is interesting. The one on the federal courts is clear without being involved; and a perusal of it would have saved two lawyers the humiliation witnessed the other day of being thrown out of the Supreme Court on technicalities. The author has wisely refrained from attempting explanations that would involve legal learning, as where he follows the language of the statute in stating the jurisdiction of the Court of Claims, even though a delusive simplicity is the result. Delusive simplicity is inseparable from the kind of thing here attempted. Particularly valuable to non-legal readers will be the description of every step in a cause, beginning with the relation of attorney and client. In a concluding chapter on the reform of legal procedure the author does his bit toward educating the public in the difficulties involved and in the realization that a great wave of public sentiment must be created in order to achieve progress. In so far as his book helps to an understanding of the existing situation it will help the cause of reform.

HECTOR G. SPAULDING.

ARNESON, BEN ALBERT. *Elements of Constitutional Law.* Pp. 359. New York: Harper and Brothers, 1928.

The purpose of this book, the author tells us, is twofold: it is designed for the general reader who desires an introductory survey of American Constitutional Law, and also for the student in Liberal Arts courses in that subject. The first of these objects is undoubtedly secured; for the book gives a clear, brief exposition of the American Constitution as it has been developed by the Supreme Court—a statement unhampered, so far as it is humanly possible, by erudite citations of cases. The second goal, however, is not quite reached, for it necessarily lies somewhat off the main road which leads to the first. The book is a little too elementary for the college student, even though it be used only as a clamp to hold the multifarious parts of a case-book together. The unusual scarcity of case citations becomes for the student a fault rather than a virtue, and he misses also the suggestive criticism which he can find in an author such as Burdick.

R. MACGREGOR DAWSON.

POLLOCK, JAMES K. *Readings in American Government.* Pp. xiv, 354. New York: Henry Holt and Company, 1927.

The author of these readings states in his preface that the selections "have been made with a view to bringing the student or general reader into contact with many of the significant men who have either occupied the governmental stage or have been peculiarly situated or fitted to depict the important phases of American politics."

These words "should reveal to the reader the real value of governmental institutions, just as good literature reveals the soul and life of a people." He proposes to choose the classic rather than the ephemeral in the literature of American political institutions. A brief introductory statement before each selection adds to the understanding of the circumstances surrounding each contribution.

There can be no doubt but that the choice of the author of these concise, clear, comprehensive, and readable writings, speeches, or decisions of the courts has been above the ordinary. It is a difficult task to form judgments on fragments of political literature, some long extant and worthy of frequent reading, some of recent origin, and worthy of presentation with the classics. The task of elimination of material on the one hand, and of satisfying the particular needs of the classroom on the other, has been excellently done by Dr. Pollock. The combination of portions of *The Federalist* and early constitutional writings and decisions of the founders and expounders with the later views of Wilson, Roosevelt, Root, and Bryce, among others, tends to give the readings a scope and importance which is a great credit to the author and a worthy volume for the study of both student and general reader.

EDWIN A. COTTRELL.

DENNIS, A. L. P. *Adventures in American Diplomacy.* 1896–1906. Pp. x, 537. Price, $5.00. New York: E. P. Dutton, 1928.

Our present international prominence has led to the making of many books on diplomatic history. Six stout volumes on our foreign policy have appeared within the past two years. This book relates the "inside story" of the most perilous period in that history. Professor Dennis analyzes it and substantiates his analysis with documentary evidence. The great contribution of the book is its revelation of this information—largely based on material previously unpublished.

The title is well chosen. The decade 1896–1906 was a period of adventure in our diplomacy—a time "when the United States ventured forth on seas that were unknown to the vast majority of Americans." Contrary to the usual belief, Dr. Dennis does not hold that we were isolated in 1896; we simply at that time cared little for diplomatic questions. The book is a critical commentary on our relations to other nations in certain outstanding international incidents—the Venezuelan boundary dispute, the Spanish American War, problems of the Far East (especially in Hawaii, China and Japan), the Panama and Caribbean policies, and questions in Africa and Turkey. It is really a series of essays touching the high lights in the crucial decade of American foreign policy, since "almost any chapter in this book can be read independently." The book is "a sign post to materials" rather than a history. It aims not so much at changing our opinion as it does at making that opinion an intelligent one.

Professor Dennis is an historian, not a propagandist; we wish he might have injected more of his own conclusion into print, at least in a final chapter. He writes to give data for conclusions which the reader is left to draw for himself. The discussion is scientific rather than popular. Diplomacy is dry in the written description. The author takes out the dryness by emphasizing persons rather than principles, and by a racy style of writing. (*Cf.* page 321—"soon he was to go to France to restore the wilting *morale* of men who thought they saw $40,000,000 go glimmering"; page 332—"where bottle after bottle of champagne was poured over the head of General Huertas"). The account lives, too, because of the personal touch of Olney, Hay, Root and Roosevelt.

To use financial parlance, the book may be said to uncover no previously "unknown deals," either honorable or dishonorable; it shows rather why the directors voted as they did and what they said to each other before the ballots were cast. This "inside story" represents extensive research in archives and painstaking accuracy in editing the data. Our diplomatic record is not blackened by the book; we simply understand our blunders better. "There was no diplomatic service in those days." "Too often the vote of a Senator for a treaty, which had a perilous passage to face in the

Senate, could be saved by the appointment of a consul or higher official on his recommendation" (page 518). We can be thankful that experience and the Rogers Act have bettered the system.

HARRY T. COLLINGS.

HARING, CLARENCE H. *South America Looks at the United States.* Pp. vii, 243. New York: Macmillan Company, 1928.

"South America Looks at the United States" appears at an opportune time, when increased attention all over the world is being focused on South America and on the relations of the United States of America and South American Republics. With the debates and sometimes heated discussions of the Sixth International Conference of American States at Cuba a matter of history, the book can be read with increased pleasure.

The volume, an outgrowth of a year's residence and travel in South America, in 1925–1926, by Clarence H. Haring, under the auspices of the Bureau of International Research of Harvard University and Radcliffe College, represents a sincere and apparently unbiased effort to arrive at an understanding of some of the more outstanding factors that influence the relations of the people of the United States with those of the nations of the southern continent. It is divided into three parts:

In the first part is set forth (1) the various steps by which the United States of America developed its Caribbean policy of protection and intervention, and economic and commercial penetration, (2) the chief characteristics of the nations of South America as producers of foodstuffs and raw industrial materials, as a home for immigrants, and fields for investment, (3) and an historical statement of Inter-American Relations.

In the second part the author discusses the more important sources of distrust embodied in the divergence in temperament and traditions between the Latin or Indo-Latin races and the Anglo-Saxon, in the methods and extent of economic and financial penetration, in the misunderstandings of the Monroe Doctrine and Pan-Americanism, in the unfriendly propaganda: propaganda of European origin whether political, commercial, or intellectual, propaganda in favor of a cultural and political union exclusively Latin in America, and propaganda emanating from hostile or ill-informed critics residing in the United States, in the movement by Spain for a "spiritual reconquest" of its lost colonies, the creation of a political *bloc* (the Pan-Hispanic Union) of all the nations of Latin America under Spanish leadership, and in the kindred movement by France and Italy to develop Pan-Latinism with France as an affectionate stepmother."

The third part analyzes the feelings of the several South American republics towards the United States. While beneath all there is a certain resemblance throughout the continent, there are considerable differences occasioned by disparity of national temperament, by diversity of national ambition, and diplomatic and other experiences with the United States that have left a sense of suspicion or distrust. Public sentiment is not uniform; it varies from one republic to another and even from one social or political group within a state.

It is a distinct pleasure to delve into the pages of this book, in which the author has attempted to analyze in apparently an unbiased manner the many and complex relations of the United States of America with the nations of South America, a continent that stands on the threshold of an era of material and intellectual progress, increasing European immigration, active development of natural resources, expanding transportation facilities by land and by sea and of increasing political stability. A wide reading of this volume both in North and South America would do much to clear away misunderstanding and to foster better relations.

CLARENCE F. JONES.

WILLERT, SIR ARTHUR. *Aspects of British Foreign Policy.* Pp. 141. Price, $2.00. New Haven: Yale University Press.

In this little volume of six Williamstown lectures the Chief of the Press Bureau of the British Foreign Office gives a rapid survey of British foreign policy since the war. The objectives of British foreign policy are stated to be peace, security, and

trade. The changed economic, financial and naval position of Great Britain in the post-war period, which forms the practical basis of this policy, is discussed, but with no special penetration.

Lectures II and III, covering the familiar story of diplomatic events in Europe from Versailles to Locarno, add little to the common knowledge on the subject. Lectures IV and V deal with the Chinese problem and are the best in the series. Western, and in particular British, policy with respect to China in the past, is critically handled, while the demands of China are given sympathetic treatment. Present British Chinese policy may be a bit idealistically portrayed. The last lecture, on the Russian Question, reflects strong approval of the Conservative policy.

A. VANDENBOSCH.

RANDALL, JAMES G. *Constitutional Problems under Lincoln.* Pp. xviii, 580, Price, $4,00. New York: D. Appleton & Co., 1926.

This is a book of constitutional history, but constitutional history from the broader standpoint; as the author defines it "not the study of a document, but rather of a social process—the process by which a community reëxpresses from time to time its will concerning its government, refitting, reinterpreting, and expanding its fundamental law so as to keep abreast of new issues,"—a definition much to be commended by any one who believes that constitutional history can be made interesting as well as scientific. The result is a book which takes into account not only the legal questions involved, but also the social and economic problems, and the human actions which gave rise to them, and especially the reactions of Lincoln's own personality to the situation.

The treatment is topical with due consideration of chronology, including the general constitutional and legal principles involved, with their incidence on the individual in the application of the law of treason; the privilege of habeas corpus, and martial law in its application north and south; conscription and its constitutionality; confiscation and emancipation; the relation of the national government to the states, with special consideration of the case of West Virginia; and the problem of press control. This work is the result of fifteen years of research, expanding from a dissertation on the confiscation of property. It is fully documented. The author has made an exhaustive study, not only of the usual printed material, but of all available manuscript sources, including the new and significant diary of Senator Orville H. Browning of Illinois, as well as the usually unprinted court records. His annotated bibliography (in which Burgess' *Civil War and the Constitution* might well have been included) will be useful not only to the professional historian but to the graduate student, and intelligible even to the undergraduate. Professor Randall has given us a highly valuable work not only to the specialist in the period, but for the study of parallel questions arising during the World War, and for any study of general American constitutional history. It is readable and understandable for the layman as well as the student.

GEORGE M. CHURCHILL.

JONES, HOWARD MUMFORD. *America and French Culture, 1750–1848.* Pp. xvi, 615. Price, $5.00. Chapel Hill: The University of North Carolina Press, 1927.

Although Mr. Jones professes literature, he has written here a book that is of tremendous value to all scholars in the field of the social sciences. Indeed he has devoted the whole of this volume to a consideration of the social forces, at work in America, that have been affected by French culture; the task of showing French influence on our literature he has relegated to a second volume not yet written. It is necessary and right that he should do so, for literary historians are becoming more and more of the opinion that the writings of a people cannot be dissevered from their social and political lives. In order to appreciate the one, the student must first have intimate knowledge of the other.

The reader is at once impressed with the scholarly manner in which Mr. Jones has proceeded. He admits readily, in more than one place in the book, that there are of necessity obvious gaps in his material. The field is too broad to be handled in its

entirety in even so many as six hundred pages. He has frequently been unable to get at the sources. But his method throughout is that of the careful workman. The footnotes are numerous; the bibliography extends to twenty-five pages; nor does he ever assume that for which there is no basis for assumption.

The task of compiling and writing an "influence" book is one of the hardest that confronts the productive scholar, not because there is a dearth of facts, but because there are ordinarily too many. If there is any one criticism to be made of this work, it is that Mr. Jones erred in his manner of presentation, for fact crowds upon fact so fast that the bewildered reader finds it difficult to leap back and forth from seventeenth to eighteenth century, from New England to the South, from Huguenot emigrant to French *voyageur*. The problem of organization is always a difficult one to handle; Mr. Jones at least hews out a definite pathway through a matted tangle of interesting fact.

The first three chapters of the book are intended to clear away that matter which must be recognized before one can have understanding of the influence any foreign culture may have on a new and growing land. They treat of the rise of conflicting forces in the colonies: the cosmopolitan spirit; the growth of commercialism and the origin of a middle class consciousness; and the romantic, energetic force of the frontier. Then, in two long chapters, the author takes note of French migration to America. His stage now set, he introduces the reader to the French language and its influence, the manners of the Frenchman, his art, religion and his philosophy, all interpreted in terms of the impressions they made on American life. In the last hundred pages, Mr. Jones, discussing the conflicting forces in politics, traces Franco-American relationships down to 1848.

In his concluding statement the author remarks that our culture has had its manners and fashions formed by the French in much greater degree than it has its philosophy and other intellectual matters. On the former there has been real influence; in the field of the latter there has been only vogue.

DOUGLAS L. HUNT.

BURGESS, JOHN W. *The Sanctity of Law: wherein Does it Consist?* Pp. x, 335. Boston: Ginn & Co., 1927.

In sentences strikingly reminiscent of his earlier work, *The Reconciliation of Government with Liberty*, Professor Burgess has recited the story of the western world for freedom. The treatment throughout is historical, and aims to show that changes in government have for the most part occurred because of popular dissatisfaction with the sanction behind the law. There is very little in the book that is new, either in fact or interpretation. The opportunity for a real contribution to the subject in the chapter on the League of Nations is lost through the prejudice of the author against the League. Finally, the style is so unspeakably dull that few readers are likely to find themselves repaid for the struggle necessary to exhume what ideas the book does contain.

WILLIAM S. CARPENTER.

WEATHERLY, ULYSSES G. *Social Progress.* Pp. xviii, 388. Price, $3.00. Philadelphia: J. B. Lippincott, Co., 1926.

The keynote to this volume is found in the preface. "The present book does not attempt a historical survey of the growth of ideas or theories of progress. . . . My method, therefore, is primarily neither historical nor speculative, but pragmatic. Emphasis on the dynamics of change furnishes whatever of unifying principle the work has. . . . I have no single philosophy of progress; in fact, I shall have written in vain, if I have failed to make clear that I believe there is no single principle of progress."

The work is divided into five sections. The first, *Conditions*, Part I (five chapters), deals with such matters as the population, heredity, races and classes, mind in social evolution. Part II, *Attitudes* (six chapters), tells of the reaction to the conditions under such headings as economic determinism and *laissez-faire*, the pessimist, the conservative, radicals and utopians. Part III, *Factors* (six chapters), discusses valuations, scientific spirit, social contacts, leadership and ascendancy. Part IV, *Pathology* (three chapters), treats of the pathology of

progress, stagnation and retrogression, social stereotypes. Part V, *Process and Product* (two chapters), on guidance of social change, and some goals of effort.

It so happens that the writer of this note has had occasion to use this book in recent months. He has found it readable, clear and well documented. Many authorities are cited. The discussion is sensible and not marred by obvious bias. It is a thoughtful and thought-provoking work. It is to be highly commended to those who seek to know something of the underlying problems of our social life, most of all perhaps, to those who confuse bigness and greatness.

CARL KELSEY.

Recent Developments in the Social Sciences. (By the authors named below.) Pp. vii, 427. Price, $3.00. Philadelphia: J. B. Lippincott Co., 1927.

The writers and their topics are: *Sociology*, Charles A. Ellwood; *Anthropology*, Clark Wissler; *Psychology*, Robert H. Gault; *Economics*, J. M. Clark; *Political Science*, J. M. Clark; *History*, H. E. Barnes, and *Cultural Geography*, C. O. Sauer.

He who wishes to know what has been going on in these fields will find here a very convenient summary. No one method is followed. Ellwood, for instance, discusses recent writers and their viewpoints with some attempt at evaluation, while Wissler in the next chapter discusses the problems with no mention of the students though he lists some of them and their books in footnotes.

As a whole the volume is well written and is worth reading. It belongs to the Lippincott Series in *Sociology* edited by Prof. E. C. Hayes of the University of Illinois.

CARL KELSEY.

BOSSARD, JAMES H. S. *Problems of Social Well-Being.* Pp. 654. New York: Harper and Brothers, 1927.

In planning this book on social problems, the author has broken with the traditional method of dealing with "the end-products of social ill-being," the dependents, the defectives and the delinquents in our midst. Instead he stresses the constructive factors making for social well-being. Professor Bossard believes that whatever particular social problem is studied three basic factors tend constantly to appear that, taken together, constitute "the bases of social well-being." The first factor is *economic* in its nature, comprehending the various problems of income; the second, *physical*, with its questions of health and physical welfare; the third, *psychological*, involving problems of mental hygiene.

Accordingly in Part I the author marshals a wealth of facts and up-to-date statistics on "income as a factor in well-being," "standards of living," "wages and incomes in the United States" and family budgets.

Part II discusses with thoroughness such problems of physical welfare as "the control of disease," "infection, resistance, immunity," "the communicable diseases," "the degenerative diseases" and nutrition and health. This section also includes a brief but comprehensive account of the evolution of the public health movement.

In Part III the causes and social significance of mental deficiency are treated. Considerable space is devoted to the social control of the mentally deficient and the problems of mental hygiene.

The author concludes his study with an analysis of changing backgrounds and changing objectives in social well-being. Combining insight into the nature of social problems with a simple and easy flowing style, the author has made not only a real but a readable contribution to the understanding of social well-being viewed in its economic, physical and mental aspects.

FRANK D. WATSON.

PANUNZIO, CONSTANTINE. *Immigration Crossroads.* Pp. viii, 307. Price, $2.50. New York: The Macmillan Company, 1927.

Doctor Panunzio is convinced that it is futile and unnecessary to attempt the artificial regulation of population movements by either the country of emigration or that of immigration beyond that which would restrict the migration of individual defectives obviously unfit to take up the struggle for existence in a strange land. He believes that so long as one nation possesses economic and social advantages over an-

other, people will succeed in crossing borders in spite of restrictive legislation and guards. Further, he believes that in the long run all parties concerned will benefit by this equalizing process. *Immigration Crossroads* is likely to produce the same convictions in those readers who approach it without too much bias against the alien.

It would be easy to charge the author with a strong bias of the opposite sort, for throughout his work a point of view accepting the immigrant as a valuable element in our population is evident. There is constant opposition to laws which restrict solely on the basis of mere numbers or race rather than on one of individual ability. The searching student of population may regret that more of the material available as evidence on the question of immigrant desirability has not been included, but the absence of tedious statistical tables and the omission of all but a minimum of reference citations has helped to make this study one of the few revamped doctoral dissertations which can be read understandingly with ease and profit by the interested layman. A merit such as this does much to offset any charges of "propaganda" which may be levied because of the omission of elaborate references, footnotes, appendices and meticulous documentation.

As a straightforward readable statement of the value of the immigrant in the development of the United States and of the nature and causes of the opposition to his admittance to our country, this book can be highly recommended.

DONALD YOUNG.

RADIN, PAUL. *The Story of the American Indian.* Pp. xiv, 371. Price, $5.00. New York: Boni & Liveright, 1927.

The Story of the American Indian is to Doctor Radin a story of cultural diffusion and modification, with an emphasis on North American tribes which throws the work somewhat out of balance. Most of the chapters are delightfully clear and absorbing: two or three become tedious with constant attempts to show this cultural trait was borrowed by that tribe, an offshoot of some other tribe, which modified the aforementioned trait by adding this or subtracting that, a process similar to one which took place earlier among their cousins in the West. Omission of all footnotes and the index shows the author's desire to write a readable story for the nontechnical public. With the exception of a number of these detailed cultural and tribal genealogies (fortunately few in number, for the layman does not need them) Doctor Radin has accomplished his purpose. There is no better single study of the American Indian to which the general reader can be referred.

Improvement might result from the addition of a few language, tribal and culture trait maps, a glossary of Indian names and terms with which the ordinary reader is not too familiar, and at least an abbreviated index. Also, *The Story of the American Indian* can hardly be said to be complete if practically nothing is said about his nineteenth-century contacts with the white man.

This book will do much to counteract the popular impression of the Indian as a "savage," though possibly a noble one, with few or no institutional or material cultural achievements worth mentioning in the presence of a twentieth-century white product of Western civilization. Many ethnologists will insist that the author has painted too glowing a picture of the aboriginal American, but perhaps this exaggeration, like some of the other faults referred to, is only a teacher's device made necessary by the previous bias of his pupils.

DONALD YOUNG.

CARTER, HUGH. *The Social Theories of L. T. Hobhouse.* Pp. viii, 137. Chapel Hill University of North Carolina Press, 1927.

NICHOLSON, J. A. *Some Aspects of the Philosophy of L. T. Hobhouse.* Pp. 86. University of Illinois, Urbana, 1928.

Critical estimates of the writings of L. T. Hobhouse are becoming quite the vogue. Two volumes on the subject, from the pens of two different authors, have recently appeared. Mr. Nicholson's study, however, is less a criticism than a description, while Dr. Carter's work is an evaluation of Hobhouse's theories.

Mr. Nicholson is interested in the phi-

losophy of the British scholar. He traces in some detail the development of Hobhouse's views from "The Theory of Knowledge" to the recent "Principles of Sociology." He writes accurately and sometimes with surprising penetration, but not always with literary skill. Occasionally the sentence structure is hopelessly involved.

Dr. Carter emphasizes Hobhouse's social theories. He paints with vivid strokes a picture of the Englishman bridging the gap between philosophy and the social sciences. Prehuman adaptation in the evolutionary process, the broad lines of social evolution, social theory and present world problems—these are a few of the subjects considered. The style is excellent, and the text highly readable throughout.

Both volumes should be eagerly welcomed by students of the social sciences. They help to round out the literature of the field. And they will have accomplished their purpose if they bring about a more sympathetic appreciation of that brilliant thinker—L. T. Hobhouse.

A. F. M.

SELIGMAN, E. R. A. *The Economics of Instalment Selling.* 2 vols., Pp. xii, 980. Price, $8.00. New York and London: Harper & Brothers, 1927.

The first volume of this elaborate study contains a scholarly piece of work by Professor Seligman; the second includes the results of a series of intensive investigations carried on under his supervision by a number of his associates among whom are Mr. Robert A. Love, Professor George Filipetti, Professor Archibald H. Stockder, Mr. Solomon S. Kuznets and Mr. Ralph W. Roby.

The first part of Volume I, described as "Historical and Statistical," traces the subject of instalment selling historically; presents an account of modern instalment selling methods; and sets forth statistics on the volume of sales. The second part of Volume I, described as "Analytical," analyzes the nature and characteristics of instalment credit, and discusses its effects at considerable length. Volume II is composed of five special investigations which are termed the Consumers' Study, the Merchandise Study, the Dealer Study, the Repossession Study, and the Depression Study. These investigations, conducted according to the scientific method, provide the factual foundation of the whole study.

Professor Seligman in his analysis of the facts throws much light on the difficult problems of instalment selling. Where facts are inadequate on account of the present state of the researches in the subject, he resorts to deductive reasoning and in each case follows the reasoning through to logical conclusions.

His conclusions as given in the final paragraph of Volume I are as follows:

> Summing up the entire matter, we should say that instalment selling, like every new institution, is subject to the perils of novelty. It has engendered new devices and has created a new technique, but it has undoubtedly come to stay. Some abuses and perils which it was short-sighted to deny have crept in. What is needed is to apply to each particular case some of the results of the analysis which we have attempted to present. As the years roll by, experience will teach us to what classes of commodities and to what strata of society instalment selling is economically applicable. In the course of time outworn methods will be discarded and new abuses will undoubtedly appear. Is it not the part of wisdom to separate the chaff from the grain, to be on our guard against the obvious dangers, and to eliminate one by one the improper practices until, precisely as in the case of our banking structure, we may be able to establish fairly definite and generally accepted standards for distinguishing the sound from the unsound, the real from the specious? When instalment selling comes to be measured by these criteria, we may expect to learn that the innocuous and the salutary must not be confounded with the inappropriate and the regrettable, and that, in its ultimate and refined forms, instalment credit will be recognized as constituting a significant and valuable contribution to the modern economy.

In the preface, Professor Seligman says that some time previous to his undertaking the investigation there appeared in a weekly periodical an article which sang a funeral dirge over political economy, and which declared that the bankruptcy of economics was illustrated by the failure of its votaries to attack the subject of instalment selling. It was partly to defend the science against this indictment, he con-

tinues, and to show its competence to deal with an important practical problem that he was led to undertake this study. It is our judgment that Professor Seligman has been eminently successful in accomplishing the thing he set out to do. He has produced a work which will be exceedingly useful to all those seeking information on any phase of instalment selling.

WILBUR C. PLUMMER.

FAY, C. R. *Elements of Economics.* Pp. xviii, 631. New York: Macmillan Co., 1927.

A secondary school text in economics, principles and problems, well illustrated with graphs, tables and reproductions of business forms, and containing questions, exercises and references at the end of each chapter. An excellent high school text in general economics, stressing its practical and business aspects, rather than the social, political and historical phases of economics.

S. H. PATTERSON.

HOLLANDER, J. H. and GREGORY, T. E. *Notes on Malthus' "Principles of Political Economy" by David Ricardo.* Pp. cvi, 246. Price, $5.00. Baltimore: Johns Hopkins Press, 1928.

Notes on Malthus' "Principles of Political Economy" was written by Ricardo in 1820 as a commentary on *Principles of Political Economy* by Thomas Malthus. Although Ricardo's friend, James Mill, influenced him to publish his famous *Principles of Political Economy and Taxation*, he also is said to have induced him to refrain from printing his *Notes on Malthus' "Principles of Political Economy,"* because of its controversial nature.

After the death of Ricardo his printed works and unpublished manuscripts were collected and published under the editorship of McCulloch. But the *Notes on Malthus' "Principles of Political Economy"* were omitted by McCulloch, because "we doubt whether they have sufficient interest to warrant their publication."

This manuscript of Ricardo subsequently disappeared, and it has been referred to for decades as the lost *Notes on Malthus.* It was not until 1919 that the missing manuscript of Ricardo was discovered among some old furniture by Mr. Frank Ricardo, a great-grandson of the illustrious English economist.

Students of the history of economic thought will rejoice in the publication of Ricardo's *Notes on Malthus' "Principles of Political Economy."* Much light will be shed on many controversial points and on certain obscure passages in other works of both Malthus and Ricardo. Attention will also be called to *Principles of Political Economy* by Thomas Malthus, whose famous *Essay on Population* has thrown into relative obscurity his other writings on economics.

The editing of the notes has been carefully done by Professor Gregory of the University of London, and Professor Hollander of Johns Hopkins University has written an introduction of a hundred pages. The latter, as well as the former, is a valuable contribution to the history of economic thought. The volume is attractive in appearance, which is befitting such an outstanding contribution among the semicentennial publications of the Johns Hopkins Press.

S. H. PATTERSON.

BUSINESS MEN'S COMMISSION ON AGRICULTURE. *The Condition of Agriculture in the United States and Measures for its Improvement.* Pp. xii, 273. Published jointly by National Industrial Conference Board, New York, and Chamber of Commerce of the United States of America, Washington, D. C., 1927.

This is a report by a commission of ten prominent business men to its two sponsor organizations,—the National Industrial Conference Board, and the United States Chamber of Commerce. The Commission was given entire freedom in making its study, and the conclusions and recommendations drawn are its own and independent of the views of the appointing bodies.

An attempt was made to accomplish two things: first, to comprehend the agricultural situation in the United States at the present time; and second, to review and suggest measures for its relief. The Commission accordingly reviewed the facts available from the usual sources, and in addition held many hearings in various parts of the coun-

try. It heard and weighed many points of view, and the results of this survey are brought together in the report: facts, opinion, and remedies.

The Commission is struck by the complexity of the agricultural situation and the difficulty of finding an adequate solution. It suggests a gradual downward revision of the tariff having "due regard for the situation that has been established." It also suggests the establishment of a Federal Farm Board to aid in the stabilization of farm prices and production. This suggestion is elaborated upon somewhat, and constitutes perhaps the leading constructive proposal. The Commission disapproves all legislative proposals which aim to raise the domestic price of agricultural commodities.

Perhaps the leading destructive criticism to be made of a report of this kind is that it relies too largely upon general observations. While there is a certain amount to be gained by hearings and interviews, the information thus gained is of far greater value if used in connection with a detailed analysis of available statistical data. This point is well illustrated in the Commission's discussion of the influence which government regulation of produce exchanges has had upon prices (pp. 115–116). They state in general that because of government regulation "it seems not improbable that the cost of marketing may have been enhanced," and in particular that "it was for a time required that all small trades should be reported daily to the government bureau by the various houses handling such trades." The first of these statements certainly needs to be proven; the second is untrue.

WRIGHT HOFFMAN.

ENGBERG, R. C. *Industrial Prosperity and the Farmer.* Pp. xiii, 286. New York: The Macmillan Co., 1927.

This is a publication of the Institute of Economics, being one of their series of investigations in agricultural economics. Mr. Engberg in this study attempts to answer the following threefold problem:

1. To what extent are business cycles responsible for farmers' recurrent financial difficulties?
2. Is it worth while for farmers to attempt to adjust their production policies to changes in demand or costs predicted on business forecasts?
3. Are the remedies suggested for business cycles likely to prove effective in stabilizing agricultural production and prices?

The author's answer to these questions is in each case negative. To arrive at this conclusion an extensive marshalling of material and studies, bearing on each phase of the problem, is made. The analysis consists largely of correlation studies in which the author finds that weather, plant disease, and insect pests, through yield, play a far more important rôle in determining fluctuations in agricultural prices than do variations in business conditions. On the relation of weather to yield the author might well have cited the studies of Wallace, Smith, Kincer and others. On the whole, the study is well done and the conclusions seem justified.

WRIGHT HOFFMAN.

HULVERSON, GEORGE R. *Personnel.* Pp. 400. New York: The Ronald Press.

Mr. Hulverson's book on *Personnel* is one of the Business Administration Series, edited by James O. McKinney. Its purpose is to "summarize the principal features of the best known methods of personnel administration and the limitations to be borne in mind in applying them, in a comprehensive view which will enable the executive to select for his own use those plans which will be most helpful." In general, one can recommend the book as far as it goes; for the topics fully discussed, such as job analysis, sources of labor supply, methods of selection, wage determination and control, transfers, promotion and training, are dealt with clearly and dispassionately. Mr. Hulverson's feet are always on the ground and never at any time stray into what may be called the philosophy of personnel. He does not hesitate to tackle fearlessly the problem of wage control. His attempt, it is true, is not entirely satisfying, but it is none the less an interesting attack on a major problem in employee relationships. Though he does not support his statements with cases or references and the suggested bibliography at the end of the book is very inadequate, one has the feeling

that his reasoning and conclusions are buttressed by practical and ripe experience.

The book, however, fades away toward the close when the author lumps the questions of employee insurance, legal aid, restaurant management, mutual benefit plans, recreation, saving plans, medical service—accident prevention and first aid, and improvement of morale in a final chapter of nine pages, headed "Personal Service Work." Furthermore, no mention is made anywhere of the problems raised by the collective methods of dealing with workers. Shop councils and unions of all kinds seem to Mr. Hulverson not even worthy of mention. Unless Mr. McKinney plans another book dealing with these problems, the Business Administration Series can hardly be said to be complete from the standpoint of personnel problems.

REX B. HERSEY.

SMITH, ELLIOTT DUNLAP. *Psychology for Executives—A Study of Human Nature in Industry.* Pp. xii, 262. Price, $3.50. New York: Harper and Brothers.

For men who are dealing with individuals and wish a book analyzing motives and replete with factory illustrations, this volume is certainly a fine addition to the field. In a word, it certainly gives theory and practice a new coördination. Group management, through an understanding of fundamental mental operations, is the method throughout. The human aspects of handling groups and of managing through the use of this knowledge is the spirit in which the book is written. It is the reviewer's opinion that the suggestion for teaching set forth in Appendix I may be the part of the book most likely to raise differences of opinion.

J. RUSSELL DOUBMAN.

LYNCH, DENIS TILDEN. *"Boss" Tweed: The Story of a Grim Generation.* Price, $4.00. New York: Boni & Liveright.

Tweed's name is synonymous with political manipulation and venal corruption, and Mr. Lynch, an old and practiced journalist, has told the story of New York's most sordid period, with great force and effect. We have here anecdotes, racy accounts of events that had become mere echoes, pen pictures of the men of the period, men like Fernando Wood, Oakey Hall, "Jim" Fisk, Beecher, Theodore Tilton, Jay Gould, in fact all the coterie of those financiers and politicians, who made the period notorious. Nor were the women of the time neglected, especially those who figured in the hours of pleasures of the chief character and his friends and associates.

It is only fair to say that the book is highly interesting as a piece of clever journalism. It has, however, but slight value as a contribution to history or politics. It is entirely lacking in documentation and is inadequately indexed. It will be read as any well-written newspaper account of a period, or of a series of events or of a group of men; but it will scarcely be quoted as an authority. There is a five-page bibliography and a statement that government documents and newspapers have been consulted, but they are not specifically referred to, so that further investigation might be followed up.

There is no analysis of character; no discussion of causes and effect; no attempt to show how Tweed came to be, or of the underlying influences that led to his overthrow. There is no attempt to discuss the philosophy, conscious or otherwise, of Wood or Tweed or their confrères. It cannot even be classified as a human document. It may have more value than a well-written novel, although those like Theodore Dreiser's *The Financier* and its sequel, *The Titan* really afford better pictures, and give a deeper insight into underlying causes.

CLINTON ROGERS WOODRUFF.

BINKLEY, W. E. *Problems and Exercises in American Government.* Pp. 95. Published by the author, Ada, Ohio, 1926.

This is a teaching device based upon a number of years' experience with college classes. Following in general the usual organization of the more widely current textbooks in this field, and including reading assignments to these texts, the work consists essentially of series of questions under each topic which involve a great deal more than merely finding the answer in a textbook. These questions are thought-provoking, conducive to really active class debate, suggestive of further questions.

Some are factual, but the facts must be sought for, and the process of seeking facts is an entirely different one than that of merely absorbing them. This manual deserves a wide adoption; its general use would transform college courses in American Government.

WALTER JAMES SHEPHARD.

WRIGHT, H. E. *The Financing of Automobile Installment Sales.* Pp. ix, 86. Chicago & New York: A. W. Shaw Company.

Prize Monograph, Chicago Trust Co. prizes for research relating to business development and the modern trust company.

WARDWELL, CHARLES A. R. *An Investigation of Economic Data for Major Cycles.* Pp. 140 and Appendix. Doctor's thesis published by the author, the University of Pennsylvania, Philadelphia, Pa., 1927.

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NATIONAL INDUSTRIAL CONFERENCE BOARD. *Supplemental Bonuses for Wage Earners, Supervisors and Executives.* Pp. 160. New York City; National Industrial Conference Board, 1928.

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